参考資料

COSEL

TEST DATA OF LHA75F-24

Regulated DC Power Supply
September 10, 2019

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COSEL CO.,LTD.

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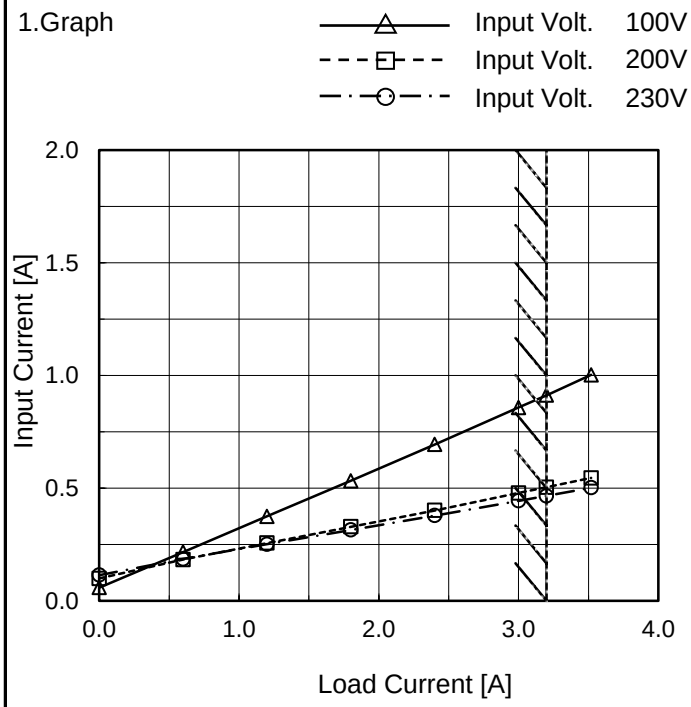


Note: Slanted line shows the range of the rated load current.

2.Values

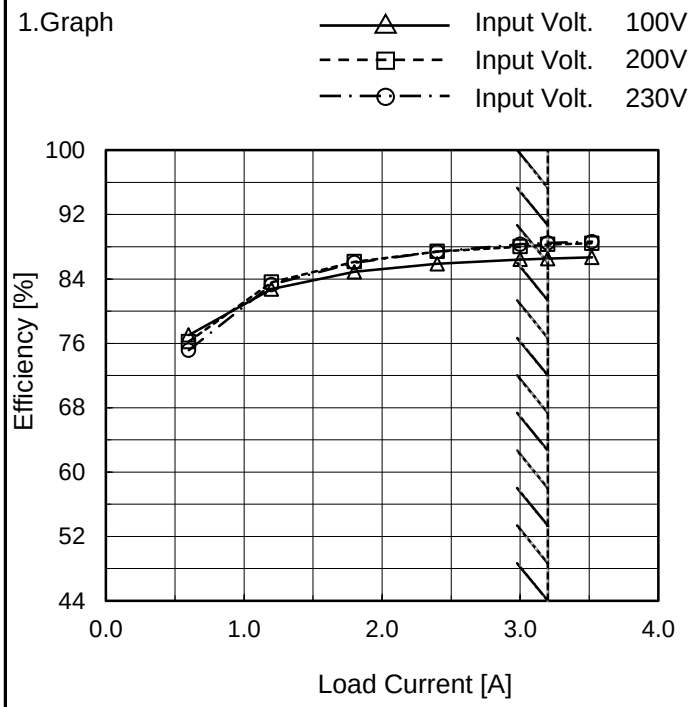
Load Current [A]	Input Current [A]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.059	0.099	0.114
0.60	0.216	0.183	0.186
1.20	0.374	0.256	0.251
1.80	0.532	0.328	0.314
2.40	0.694	0.401	0.378
3.00	0.858	0.478	0.443
3.20	0.912	0.504	0.465
3.52	1.003	0.545	0.502
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	LHA75F-24
Item	Efficiency (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

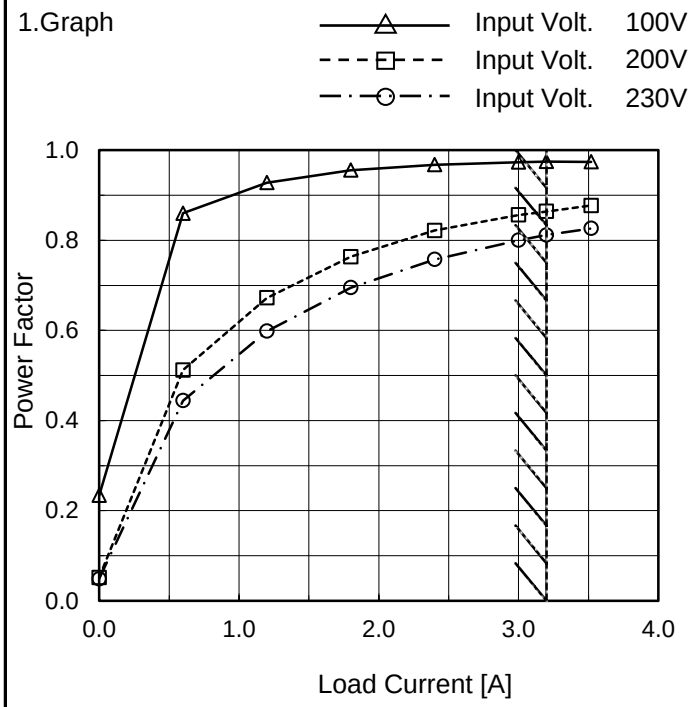
Load Current [A]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
0.60	77.0	76.2	75.1
1.20	82.7	83.6	83.3
1.80	84.9	86.1	86.0
2.40	85.9	87.4	87.4
3.00	86.4	88.0	88.3
3.20	86.5	88.3	88.5
3.52	86.7	88.4	88.6
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	LHA75F-24
Item	Power Factor (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.234	0.051	0.049
0.60	0.860	0.512	0.444
1.20	0.928	0.672	0.598
1.80	0.956	0.763	0.695
2.40	0.968	0.822	0.758
3.00	0.974	0.856	0.800
3.20	0.975	0.864	0.812
3.52	0.974	0.877	0.826
--	-	-	-
--	-	-	-
--	-	-	-

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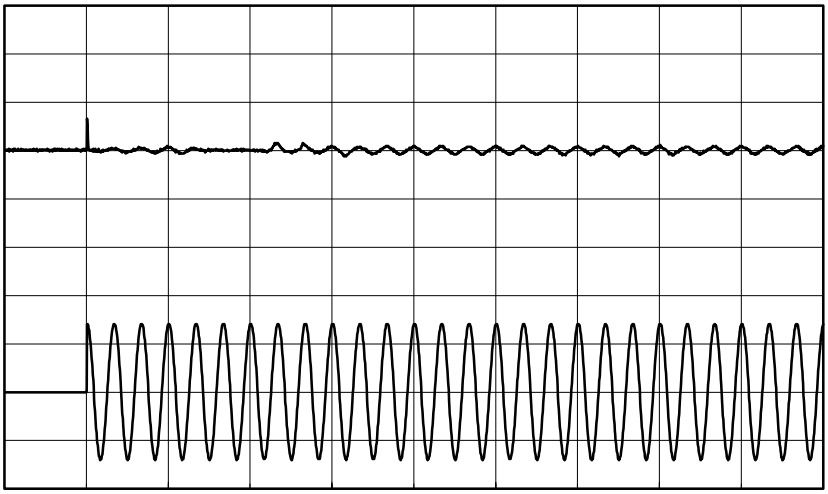
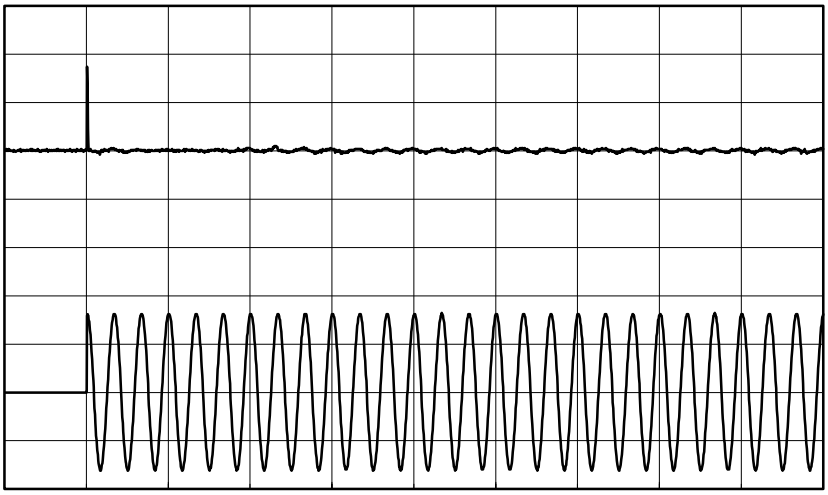
Model	LHA75F-24
Item	Inrush Current
Object	————————

Temperature 25°C
Testing Circuitry Figure A



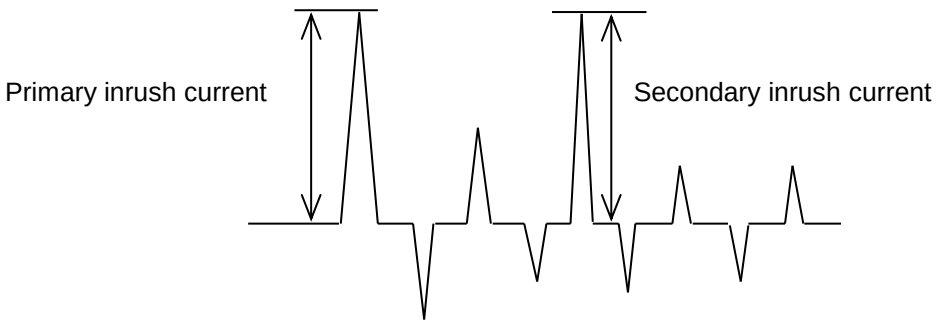
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
13.2 A
Secondary inrush current :
3.2 A



Input Voltage 230 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
34.8 A
Secondary inrush current :
2.0 A



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Model	LHA75F-24	
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B
Object	――――――――――	

1.Results

[mA]

Standards	Testing Circuitry	Measuring Method	Input Volt.			Note
			100 [V]	230 [V]	240 [V]	
DEN-AN	Figure B-1	Both phases	0.13	0.34	0.36	Operation
		One of phases	0.26	0.67	0.71	Stand by
IEC62368-1	Figure B-2	Both phases	0.11	0.28	0.29	Operation
		One of phases	0.21	0.56	0.58	Stand by
	Figure B-3	Both phases	0.11	0.28	0.30	Operation
		One of phases	0.21	0.55	0.58	Stand by

The value for "One of phases" is the reference value only.

2.Condition

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

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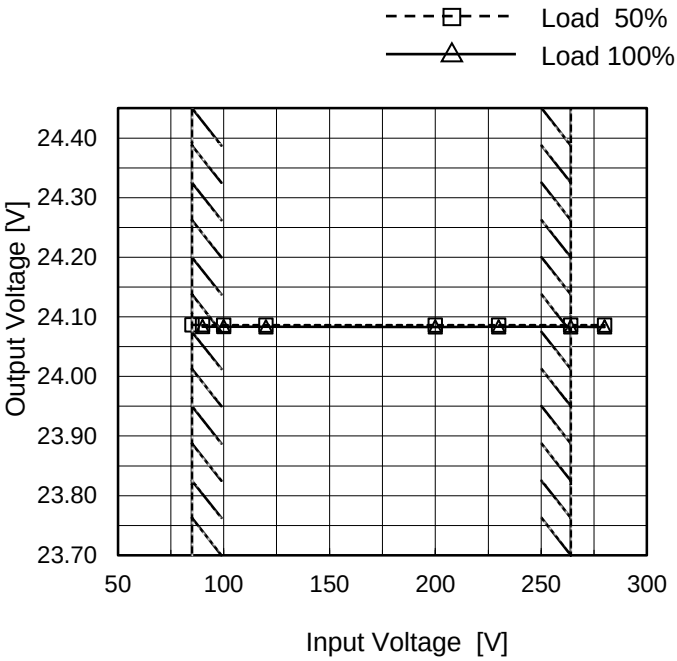
Model	LHA75F-24
Item	Line Regulation
Object	+24V3.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

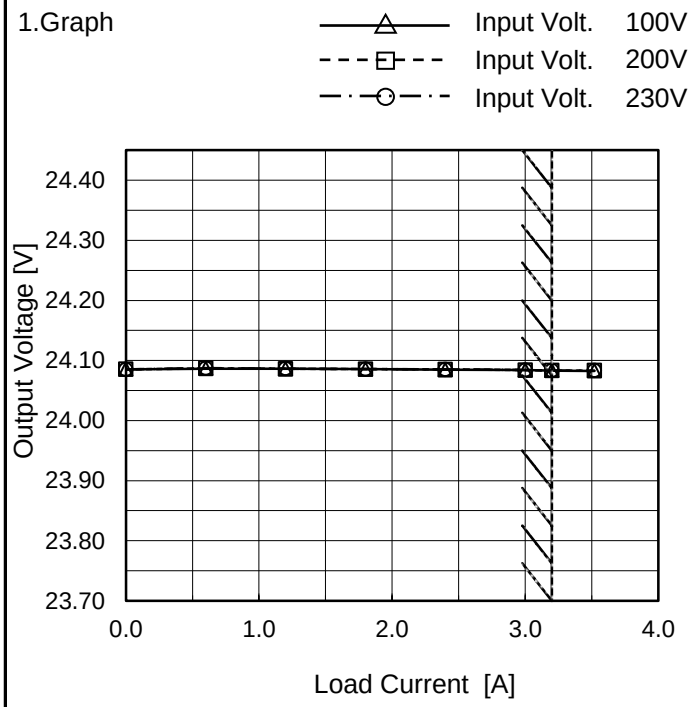
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	24.086	-
90	24.086	24.083
100	24.086	24.083
120	24.086	24.083
200	24.086	24.083
230	24.086	24.083
264	24.086	24.083
280	24.086	24.083
--	-	-

COSEL

Model	LHA75F-24
Item	Load Regulation
Object	+24V3.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

Load Current [A]	Output Voltage [V] Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	24.085	24.085	24.085
0.60	24.087	24.087	24.087
1.20	24.086	24.086	24.086
1.80	24.086	24.086	24.086
2.40	24.085	24.085	24.085
3.00	24.084	24.084	24.084
3.20	24.083	24.083	24.083
3.52	24.083	24.083	24.083
--	-	-	-
--	-	-	-
--	-	-	-

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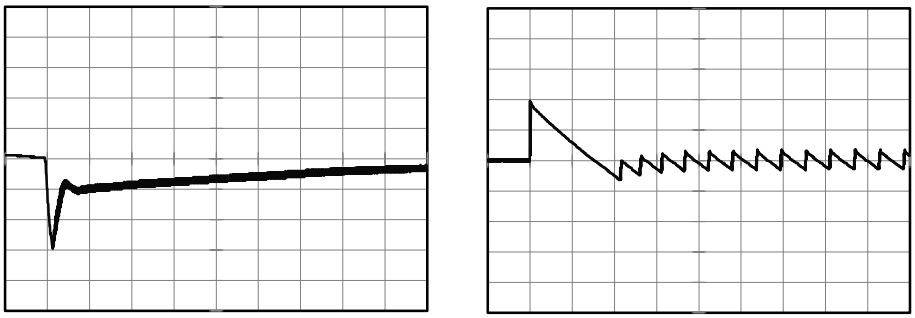
Model	LHA75F-24
Item	Dynamic Load Response
Object	+24V3.2A

Temperature 25°C
Testing Circuitry Figure A

Input Volt. 230 V
Cycle 1000 ms

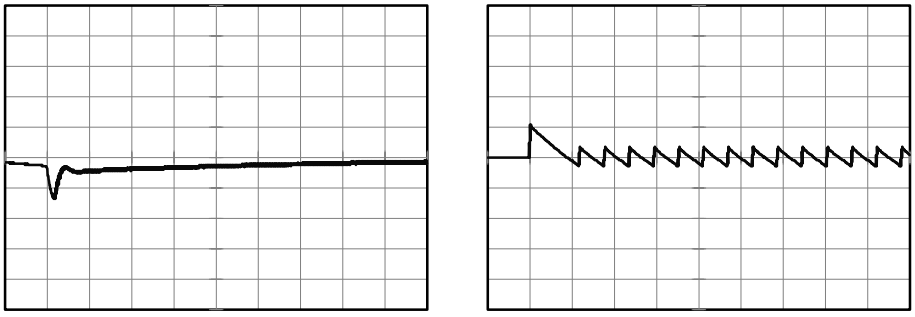
Min.Load (0A)←→
Load 100% (3.2A)



200 mV/div

1 ms/div 10 ms/div

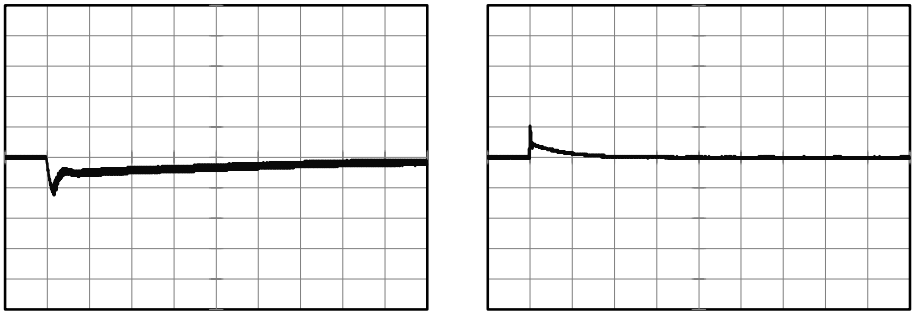
Min.Load (0A)←→
Load 50% (1.6A)



200 mV/div

1 ms/div 10 ms/div

Load 50% (1.6A)←→
Load 100% (3.2A)



200 mV/div

1 ms/div 10 ms/div

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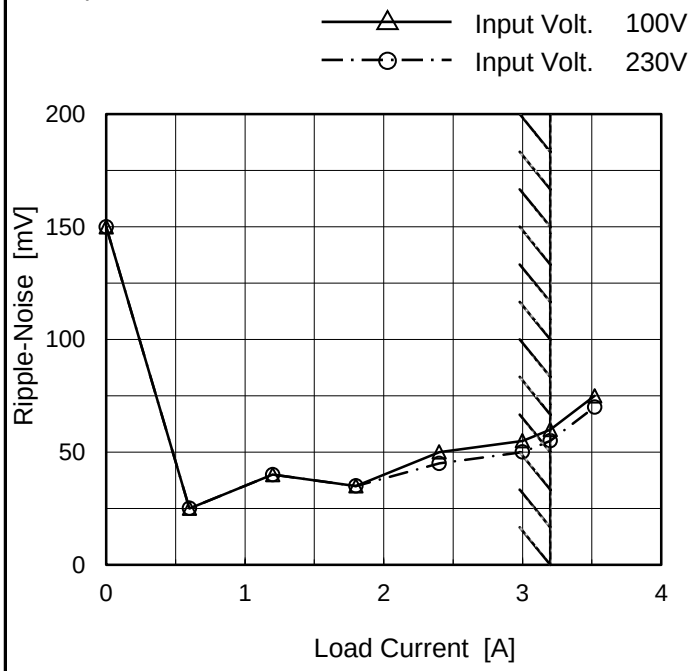
Model	LHA75F-24
Item	Ripple-Noise（by Load Current）
Object	+24V3.2A

Temperature 25°C
Testing Circuitry Figure C

1.Graph



Measured by 20 MHz Oscilloscope.
Ripple-Noise is shown as p-p in the figure below.
Note: Slanted line shows the range of the rated load current.

T1: Due to AC Input Line
T2: Due to Switching

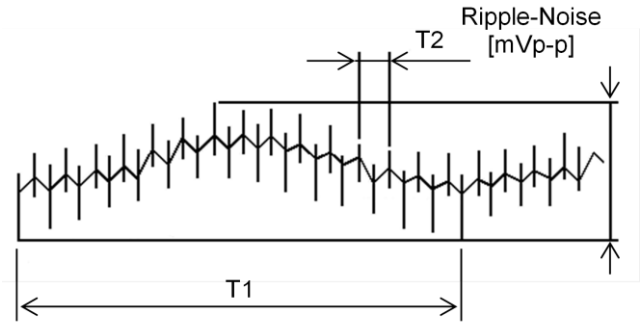


Fig. Complex Ripple Wave Form

2.Values

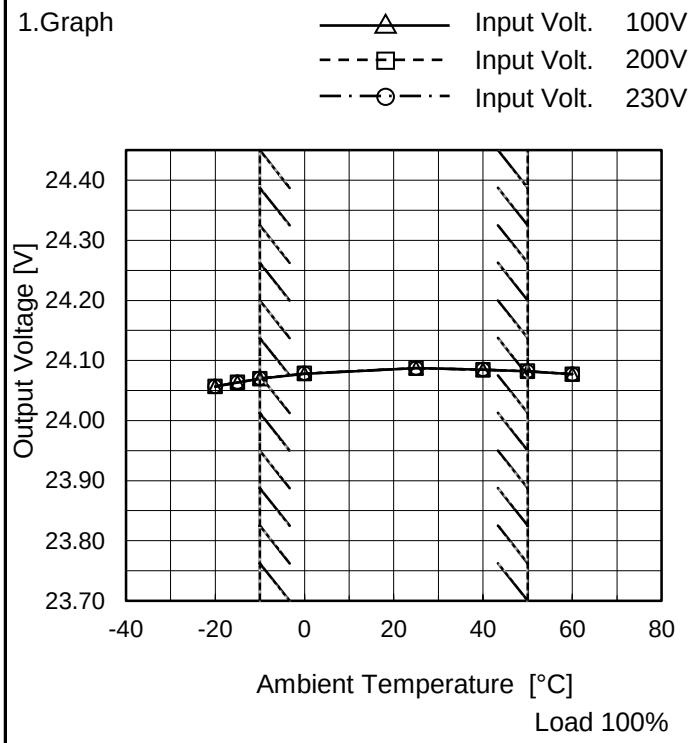
Load Current [A]	Ripple-Noise [mV] Input Volt. 100 [V]	Ripple-Noise [mV] Input Volt. 230 [V]
0.00	150	150
0.60	25	25
1.20	40	40
1.80	35	35
2.40	50	45
3.00	55	50
3.20	60	55
3.52	75	70
--	-	-
--	-	-
--	-	-

COSEL

Model	LHA75F-24
Item	Ambient Temperature Drift
Object	+24V3.2A

Testing Circuitry Figure A

1.Graph



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

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-20	24.057	24.057	24.057
-15	24.064	24.064	24.064
-10	24.070	24.070	24.070
0	24.078	24.078	24.078
25	24.087	24.087	24.087
40	24.085	24.085	24.085
50	24.082	24.082	24.082
60	24.077	24.077	24.077
--	-	-	-
--	-	-	-
--	-	-	-

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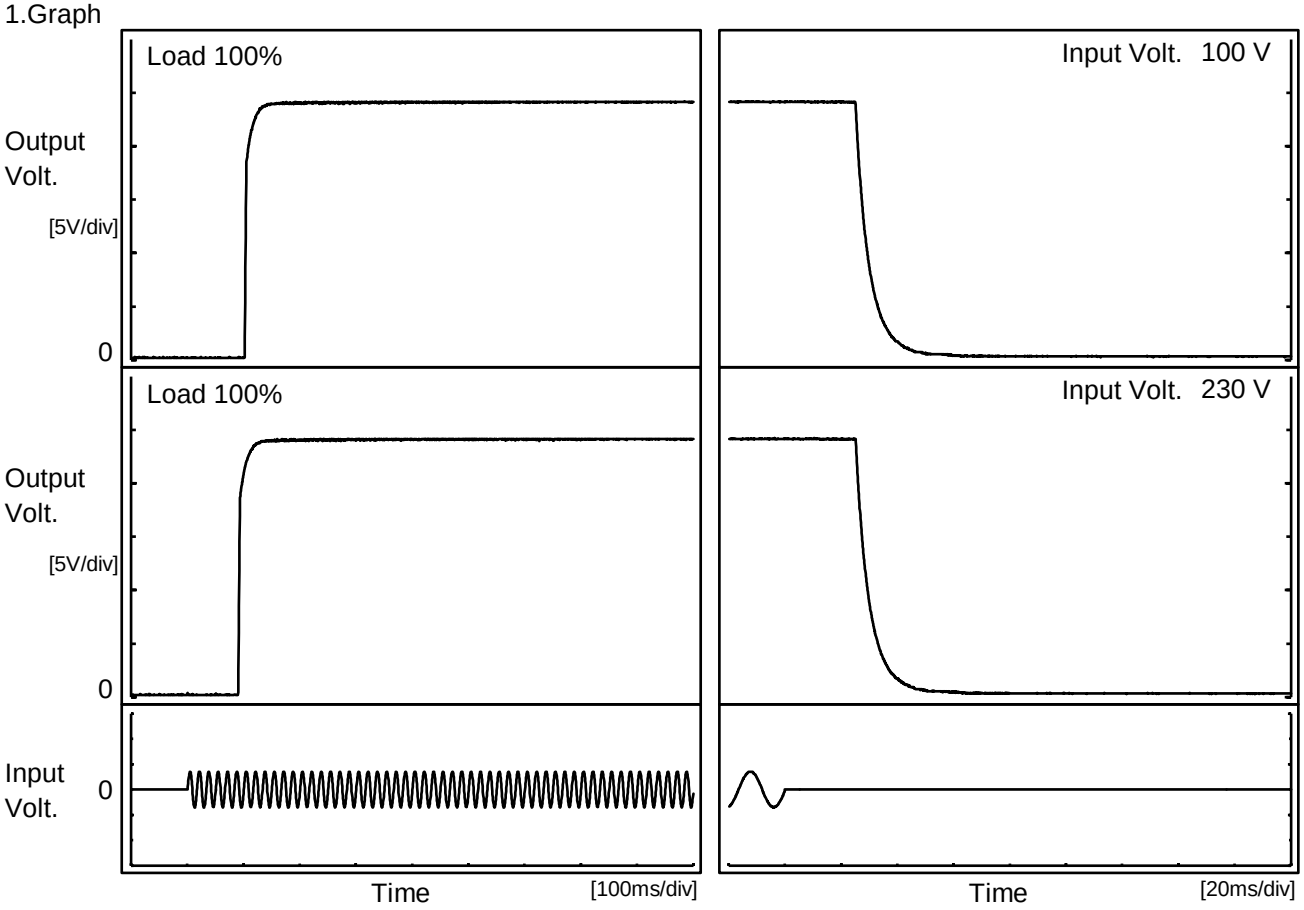
Model	LHA75F-24	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	+24V3.2A	

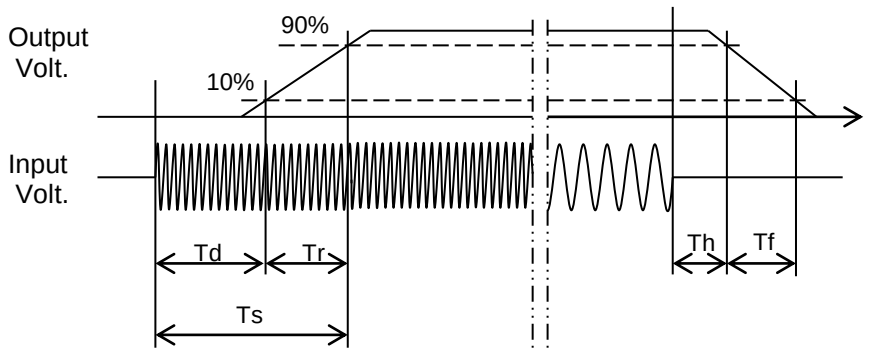
1.Graph



2.Values

[ms]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	103.0	13.0	116.0	25.5	11.3
230 V	91.0	13.0	104.0	25.6	11.2

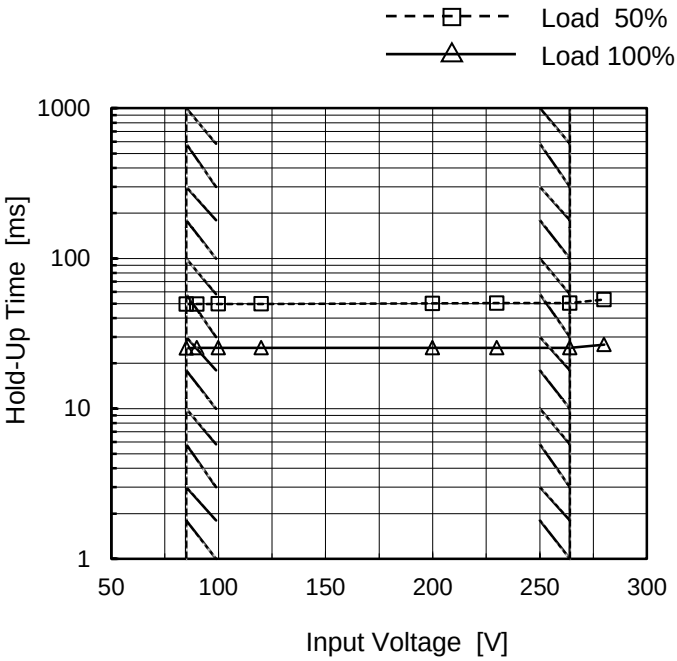


COSEL

Model	LHA75F-24
Item	Hold-Up Time
Object	+24V3.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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.

2.Values

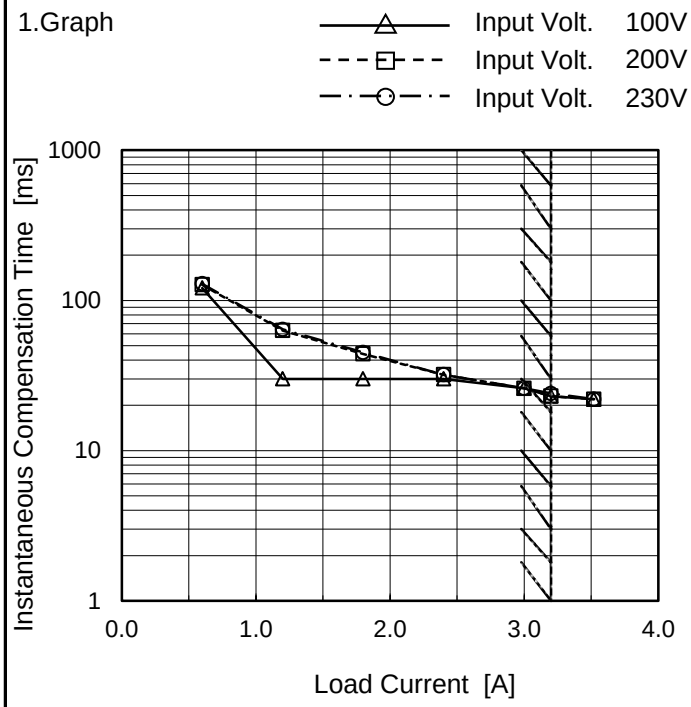
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	50	-
90	50	25
100	50	25
120	50	25
200	50	25
230	50	25
264	50	25
280	53	27
--	-	-

COSEL

Model	LHA75F-24
Item	Instantaneous Interruption Compensation
Object	+24V3.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

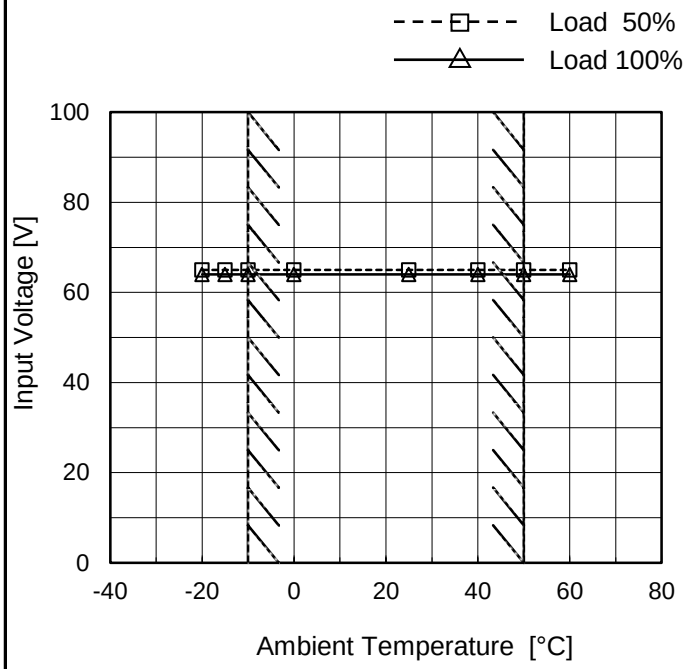
Load Current [A]	Time [ms] Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	-	-	-
0.60	121	127	129
1.20	30	63	64
1.80	30	44	45
2.40	30	32	32
3.00	26	26	26
3.20	23	23	24
3.52	22	22	22
--	-	-	-
--	-	-	-
--	-	-	-

COSEL

Model	LHA75F-24
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+24V3.2A

Testing Circuitry Figure A

1.Graph



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

2.Values

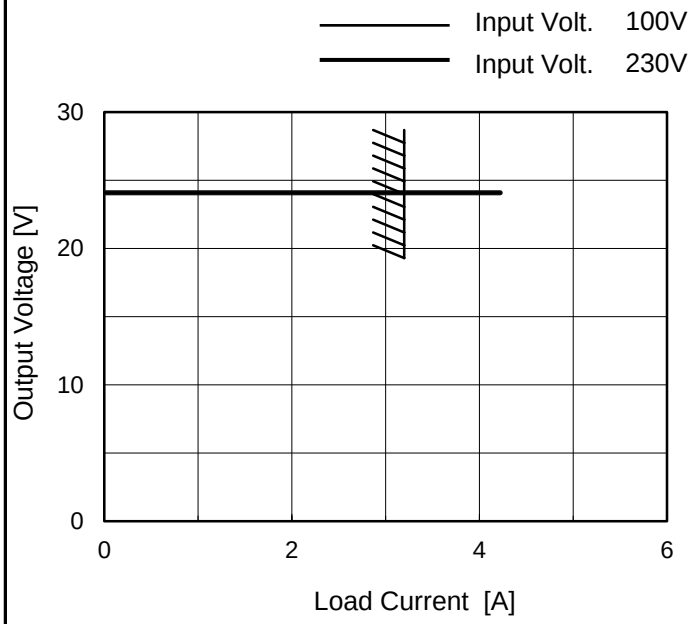
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	65	64
-15	65	64
-10	65	64
0	65	64
25	65	64
40	65	64
50	65	64
60	65	64
--	-	-
--	-	-
--	-	-

COSEL

Model	LHA75F-24
Item	Overcurrent Protection
Object	+24V3.2A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

Overcurrent protection is Hiccup mode.

2.Values

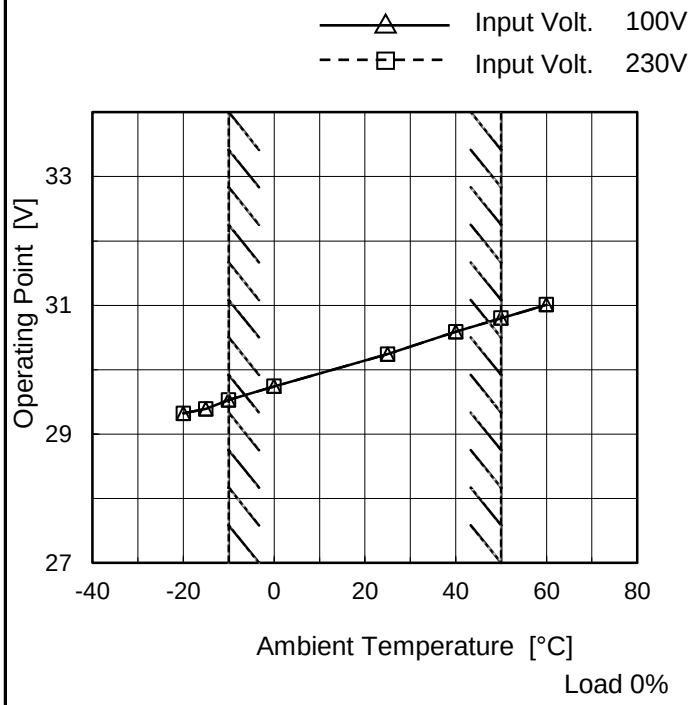
Output Voltage [V]	Load Current [A]	
	Input Volt. 100[V]	Input Volt. 230[V]
24.0	4.22	4.22
22.8	-	-
21.6	-	-
19.2	-	-
16.8	-	-
14.4	-	-
12.0	-	-
9.6	-	-
7.2	-	-
4.8	-	-
2.4	-	-
0.0	-	-

COSEL

Model	LHA75F-24
Item	Overvoltage Protection
Object	+24V3.2A

Testing Circuitry Figure A

1.Graph



Load 0%

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

2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 230[V]
-20	29.32	29.32
-15	29.39	29.39
-10	29.53	29.53
0	29.74	29.74
25	30.24	30.24
40	30.59	30.59
50	30.80	30.80
60	31.01	31.01
--	-	-
--	-	-
--	-	-

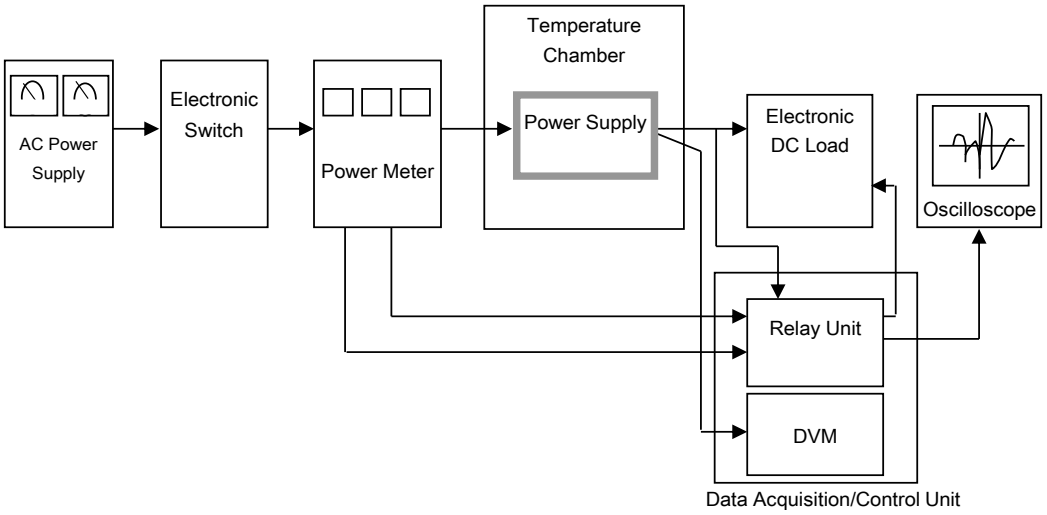


Figure A

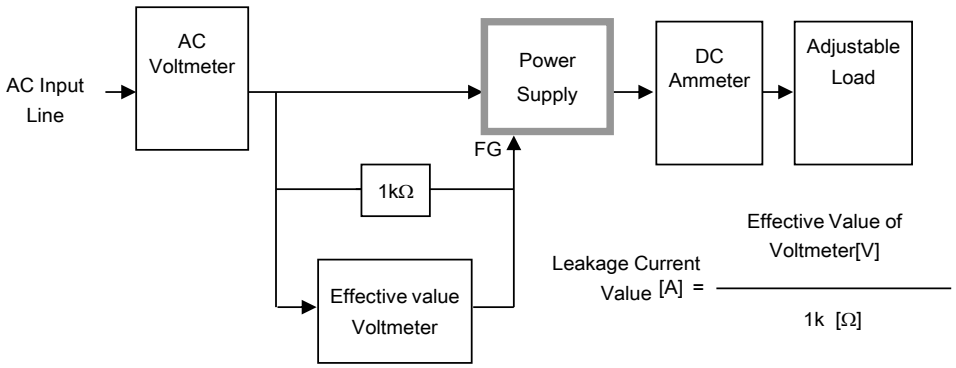


Figure B-1 (DEN-AN)

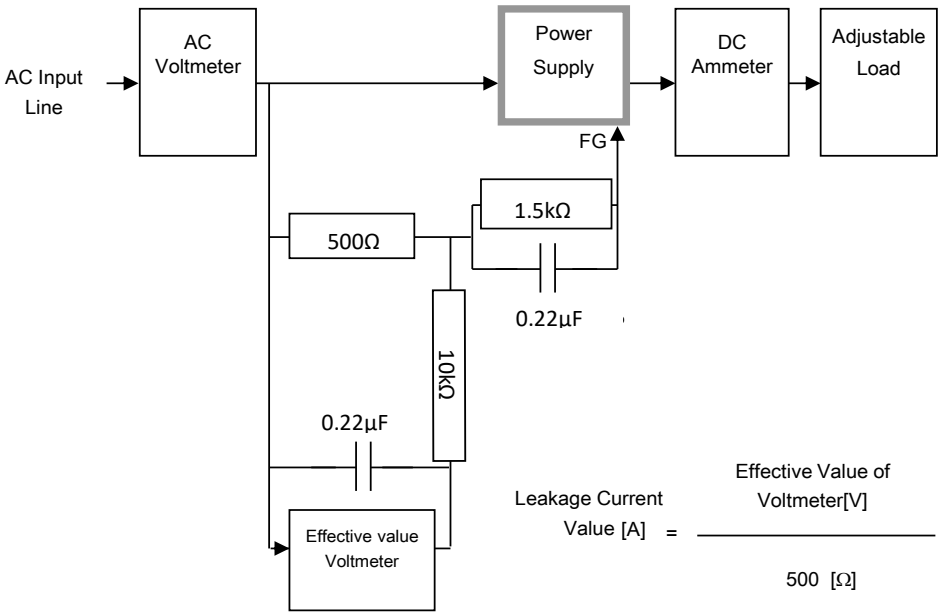


Figure B-2 (IEC62368-1 refer to IEC60990 Fig.4)

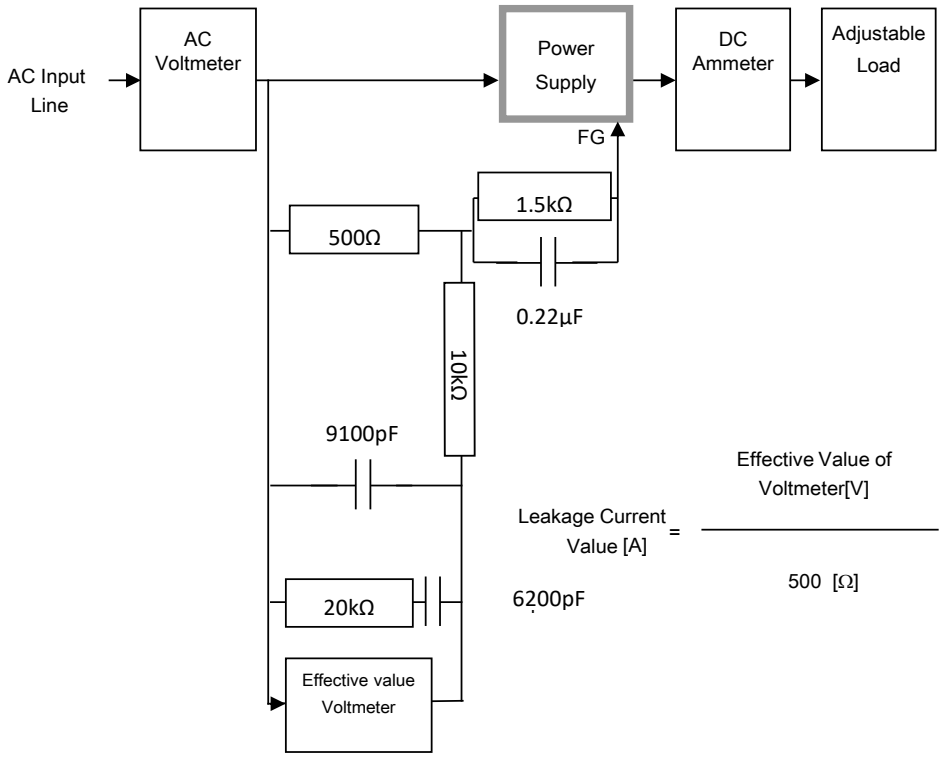
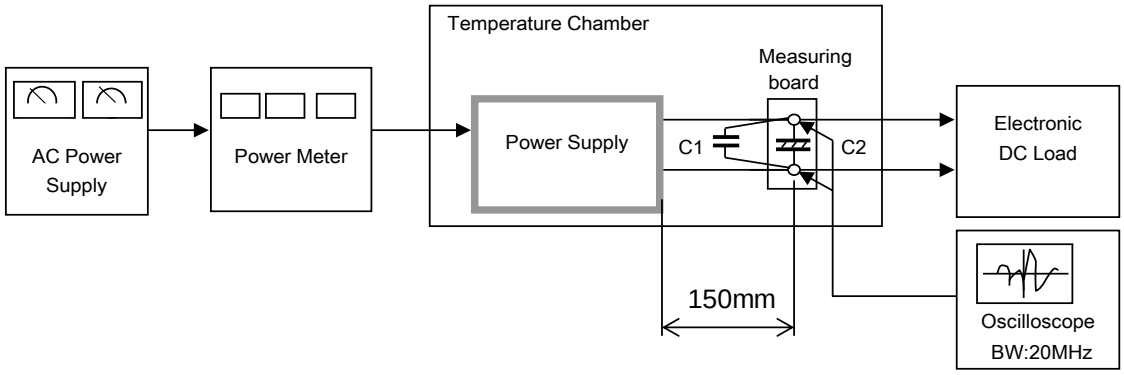


Figure B-3 (IEC62368-1 refer to IEC60990 Fig.5)



C1= 0.1 μF
(Film capacitor)
C2= 22 μF
(Electrolytic capacitor)

Figure C