参考資料

COSEL

TEST DATA OF PBW15F-12

Regulated DC Power Supply
Sep 29, 2005

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COSEL CO.,LTD.

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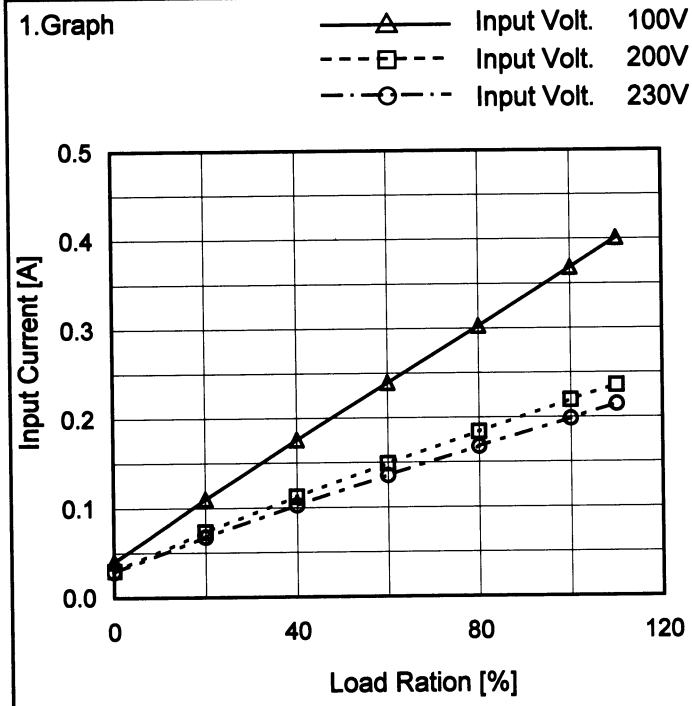
Model	PBW15F-12
Item	Input Current (by Load Current)
Object	————————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Ration [%]	Input Current [A] Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	0.040	0.030	0.029
20	0.110	0.073	0.067
40	0.176	0.113	0.103
60	0.240	0.149	0.136
80	0.303	0.184	0.168
100	0.368	0.219	0.199
110	0.401	0.236	0.215
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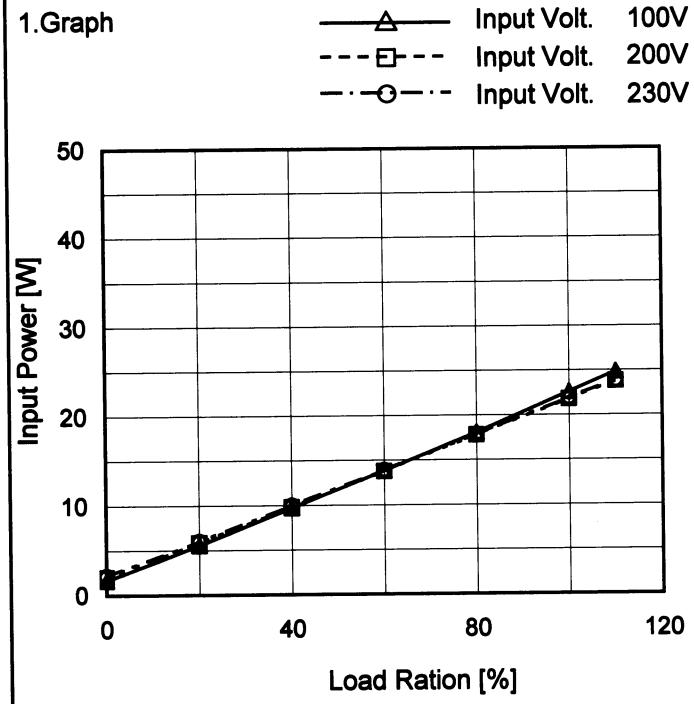
BC-10026

COSEL

Model	PBW15F-12
Item	Input Power (by Load Current)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Ration [%]	Input Power [W]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	1.67	2.01	2.14
20	5.58	5.85	5.99
40	9.72	9.80	9.98
60	13.87	13.80	13.90
80	18.11	17.80	17.90
100	22.62	21.80	21.90
110	24.90	23.80	23.90
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

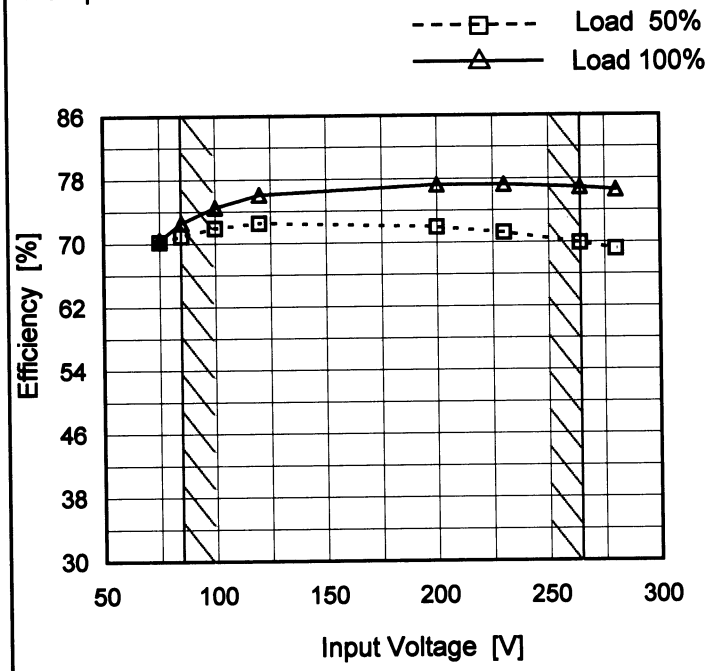
BC-10026

COSEL

Model	PBW15F-12
Item	Efficiency (by Input Voltage)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

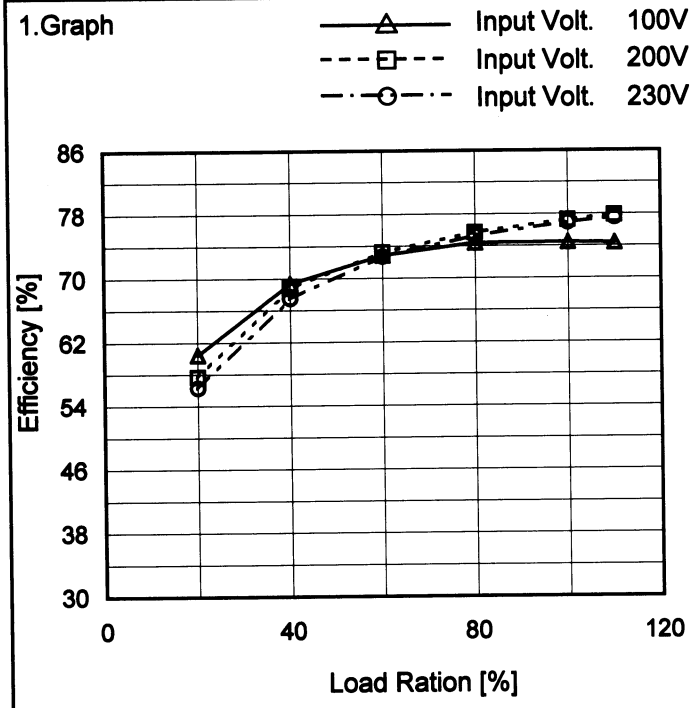
Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
75	70.2	70.5
85	70.9	72.6
100	71.9	74.5
120	72.5	76.1
200	72.0	77.3
230	71.3	77.3
264	69.9	76.9
280	69.1	76.6
--	-	-

COSEL

Model	PBW15F-12
Item	Efficiency (by Load Current)
Object	――――――

Temperature 25°C
Testing Circuitry Figure A

1.Graph



2.Values

Load Ration [%]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	-	-	-
20	60.5	57.7	56.3
40	69.4	68.8	67.5
60	72.9	73.3	72.7
80	74.4	75.7	75.3
100	74.5	77.3	76.9
110	74.4	77.9	77.5
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

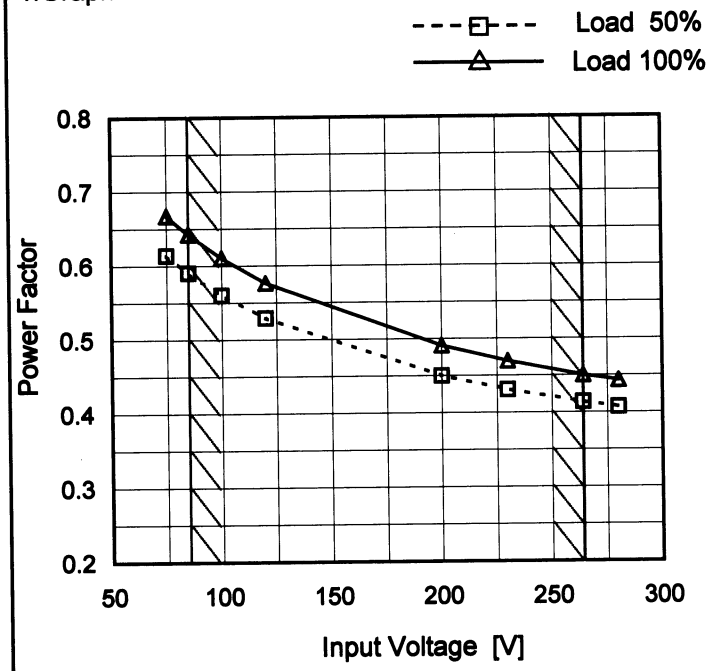
BC-10026

COSEL

Model	PBW15F-12
Item	Power Factor (by Input Voltage)
Object	———————————

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]	Power Factor	
	Load 50%	Load 100%
75	0.614	0.668
85	0.590	0.643
100	0.561	0.611
120	0.529	0.577
200	0.450	0.491
230	0.431	0.470
264	0.414	0.451
280	0.407	0.444
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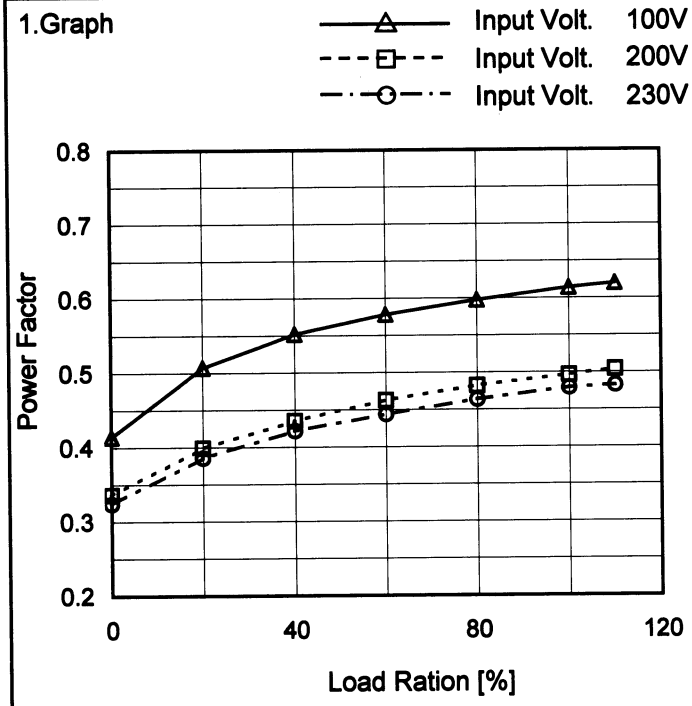
Model	PBW15F-12
Item	Power Factor (by Load Current)
Object	———————

Temperature 25°C
Testing Circuitry Figure A

1.Graph



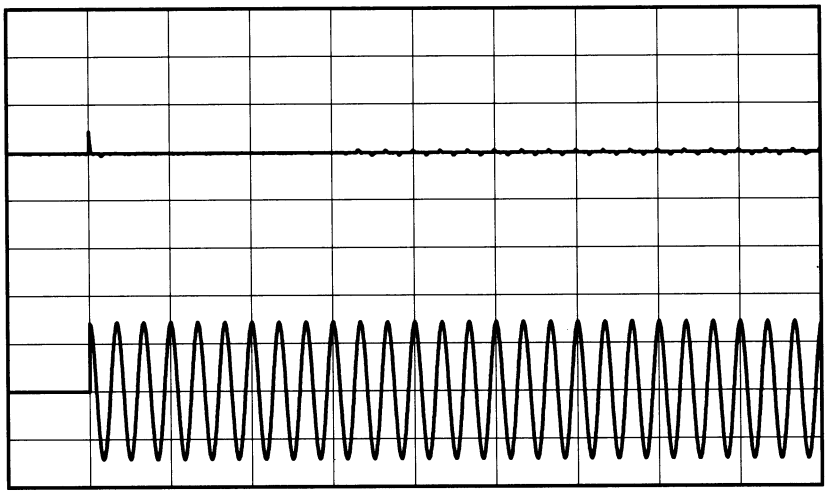
2.Values

Load Ration [%]	Power Factor Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0	0.414	0.336	0.324
20	0.507	0.399	0.386
40	0.552	0.436	0.422
60	0.579	0.463	0.444
80	0.598	0.482	0.464
100	0.614	0.497	0.479
110	0.620	0.504	0.483
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-

BC-10026

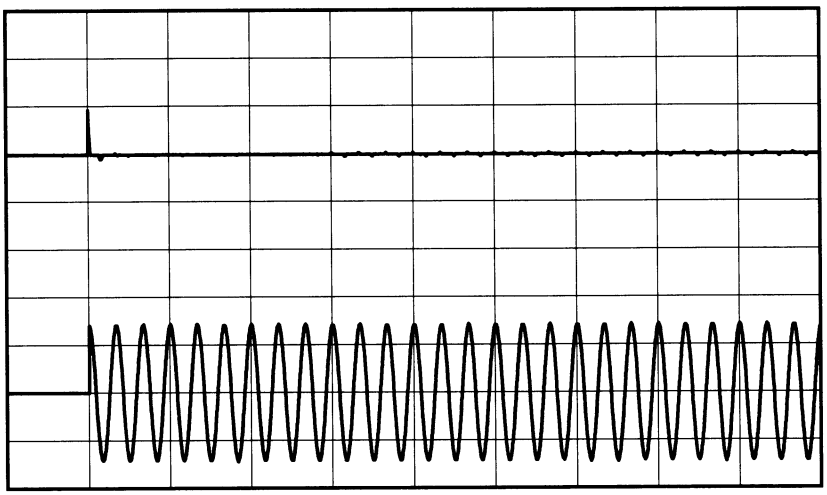
COSEL

Model	PBW15F-12	
Item	Inrush Current	Temperature 25°C Testing Circuitry Figure A
Object	———————	



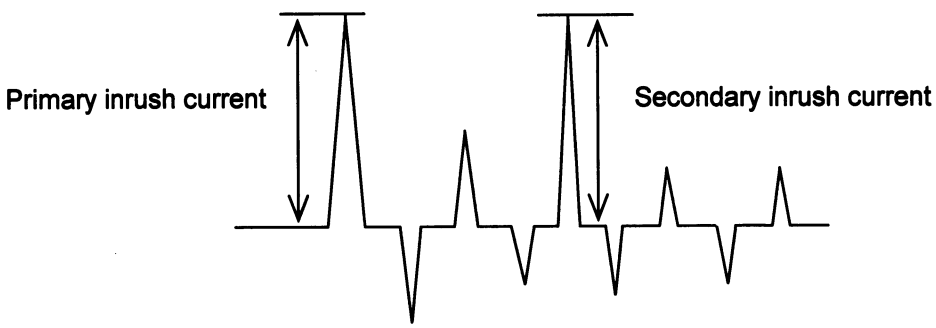
Input Voltage 100 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
8.8 A
Secondary inrush current :
1.4 A



Input Voltage 200 V
Frequency 60 Hz
Load 100 %

Primary inrush current :
18.4 A
Secondary inrush current :
1.2 A



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Model	PBW15F-12	
Item	Leakage Current	Temperature 25°C Testing Circuitry Figure B
Object	———————————	

1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
DEN-AN	Both phases	0.06	0.12	0.14	Operation
	One of phase	0.10	0.22	0.27	stand by
IEC60950	Both phases	0.07	0.15	0.18	Operation
	One of phase	0.10	0.22	0.27	stand by

The value for "One of phase" 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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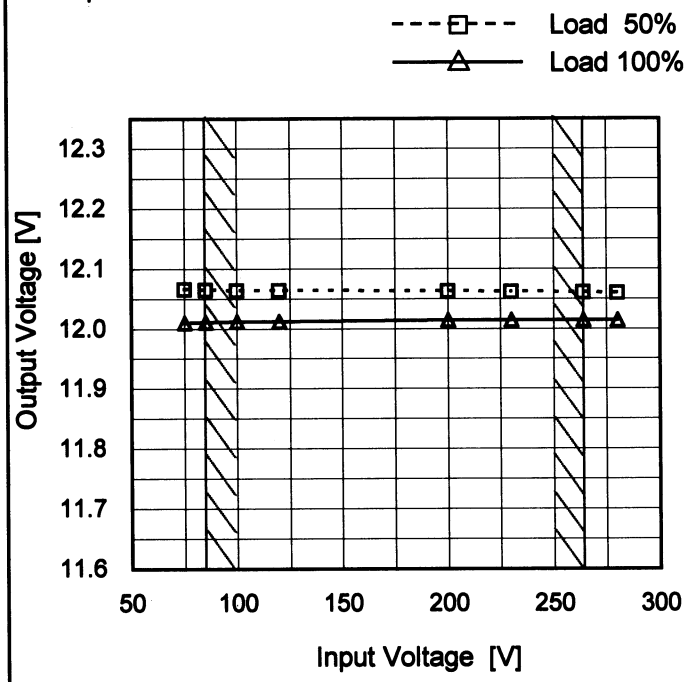
Model	PBW15F-12
Item	Line Regulation
Object	+12V0.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

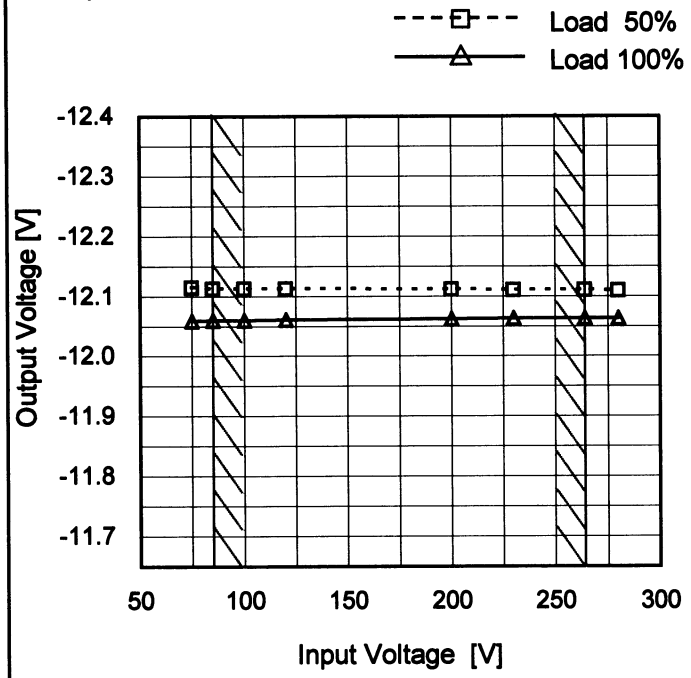


2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	12.066	12.010
85	12.064	12.011
100	12.063	12.012
120	12.063	12.012
200	12.062	12.014
230	12.061	12.014
264	12.060	12.014
280	12.060	12.014
--	-	-

Object	-12V0.7A

1.Graph



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

2.Values

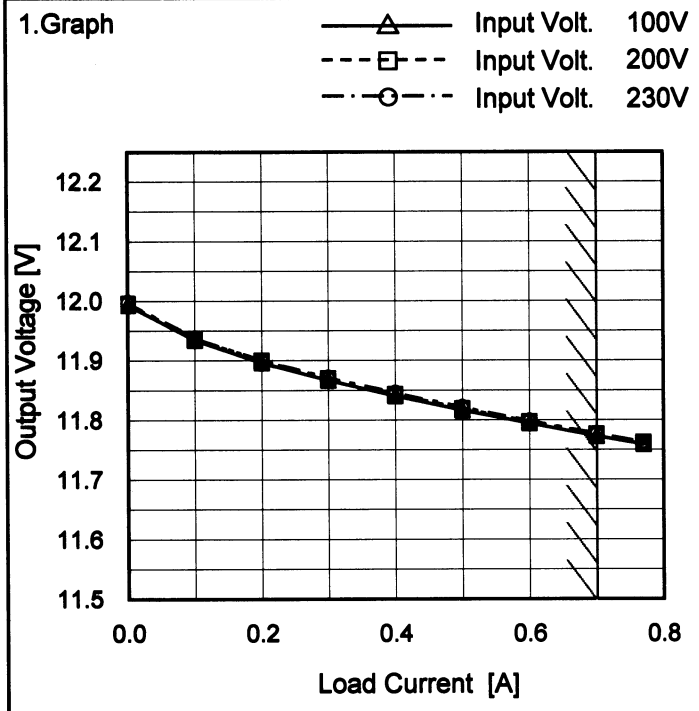
Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	-12.065	-12.010
85	-12.063	-12.010
100	-12.063	-12.010
120	-12.062	-12.011
200	-12.062	-12.013
230	-12.061	-12.013
264	-12.060	-12.013
280	-12.059	-12.013
--	-	-

COSEL

Model	PBW15F-12
Item	Load Regulation
Object	+12V0.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



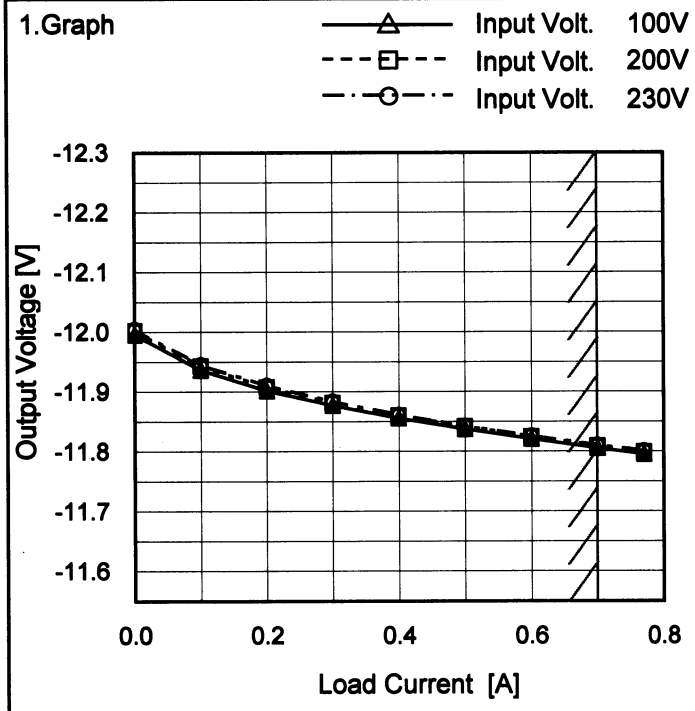
2.Values

Load Current [A]	Output Voltage [V] Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	11.994	11.996	11.998
0.10	11.934	11.937	11.938
0.20	11.897	11.900	11.900
0.30	11.867	11.870	11.872
0.40	11.840	11.843	11.846
0.50	11.816	11.819	11.821
0.60	11.794	11.797	11.798
0.70	11.773	11.776	11.777
0.77	11.759	11.762	11.762
--	-	-	-
--	-	-	-

-12V: Rated output current 1

Object	-12V0.7A

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	-11.996	-12.003	-12.005
0.10	-11.937	-11.943	-11.945
0.20	-11.902	-11.908	-11.910
0.30	-11.877	-11.881	-11.883
0.40	-11.856	-11.860	-11.861
0.50	-11.838	-11.842	-11.843
0.60	-11.821	-11.825	-11.826
0.70	-11.805	-11.809	-11.810
0.77	-11.796	-11.799	-11.801
--	-	-	-
--	-	-	-

+12V: Rated output current 1

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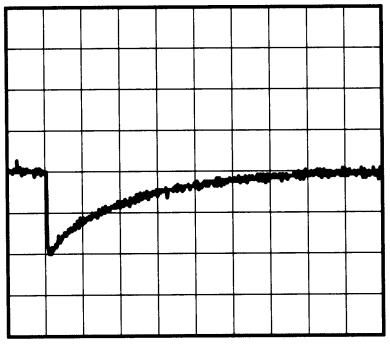
Model	PBW15F-12
Item	Dynamic Load Response
Object	+12V0.7A

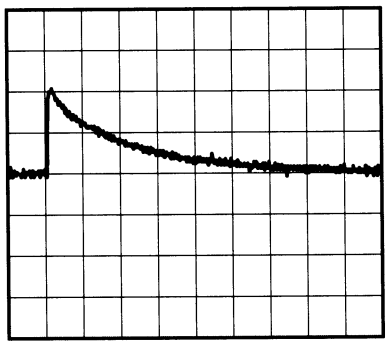
Temperature 25℃
Testing Circuitry Figure A

Input Volt. 100 V
Cycle 1000 ms

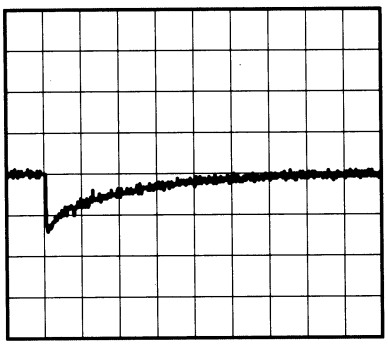
Load Current

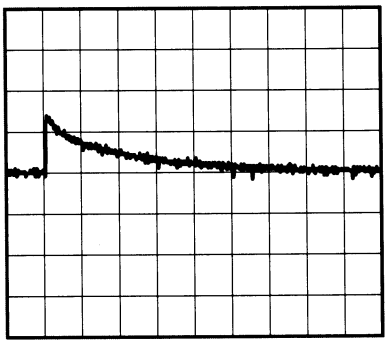
Min. Load (0A) ⟷
Output current 2 (1.4A)
* -12V: 0A





Min. Load (0A) ⟷
Output current 1 (0.7A)
* -12V: 0.7A





* The characteristic of AC200V is equal.

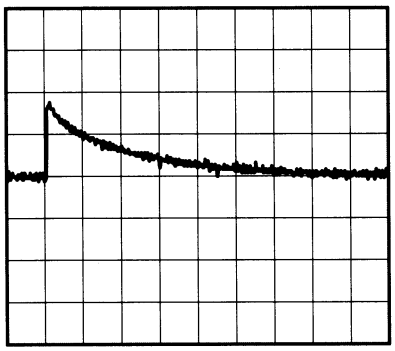
COSEL

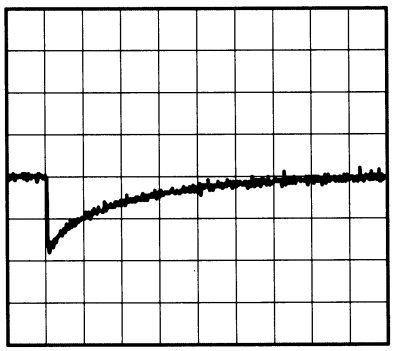
Model	PBW15F-12		
Item	Dynamic Load Response	Temperature	25℃
		Testing Circuitry	Figure A
Object	-12V0.7A		

Input Volt. 100 V
Cycle 1000 ms

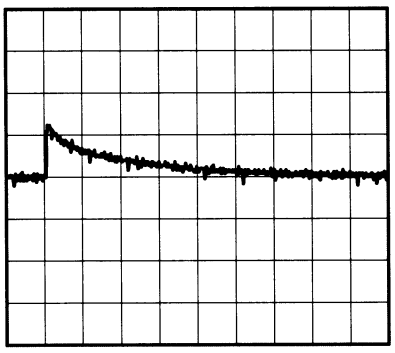
Load Current

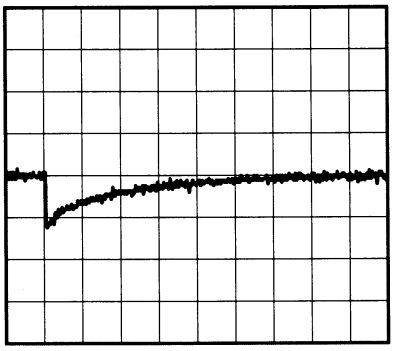
Min. Load (0A) ⟷
Output current 2 (1.4A)
* +12V: 0A





Min. Load (0A) ⟷
Output current 1 (0.7A)
* +12V: 0.7A





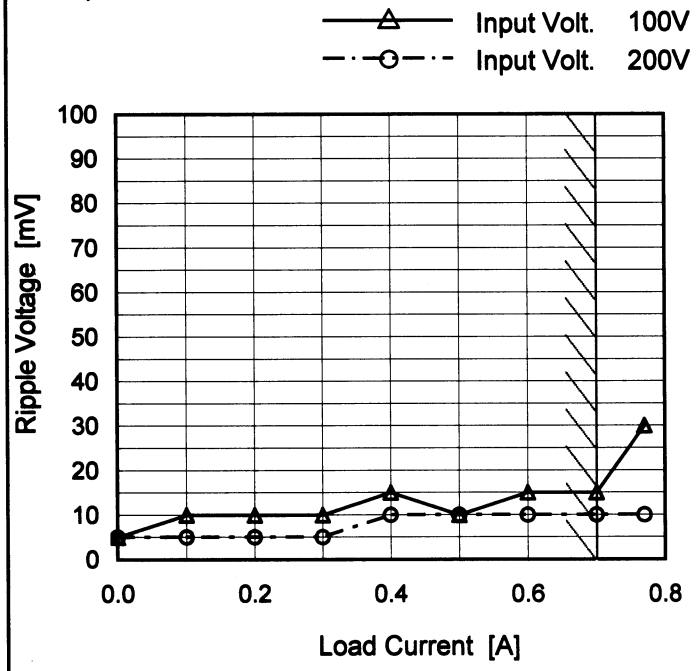
* The characteristic of AC200V is equal.

COSEL

Model	PBW15F-12
Item	Ripple Voltage (by Load Current)
Object	+12V0.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



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

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	5	5
0.10	10	5
0.20	10	5
0.30	10	5
0.40	15	10
0.50	10	10
0.60	15	10
0.70	15	10
0.77	30	10
--	-	-
--	-	-

-12V: Rated output current 1

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

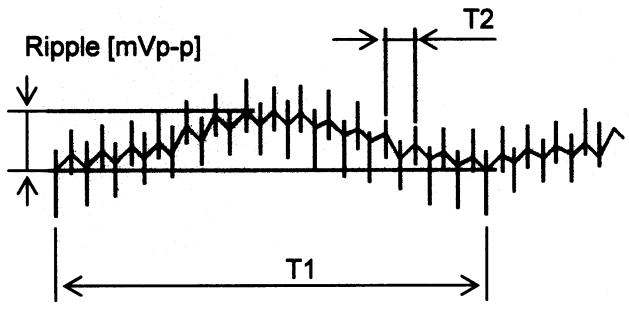


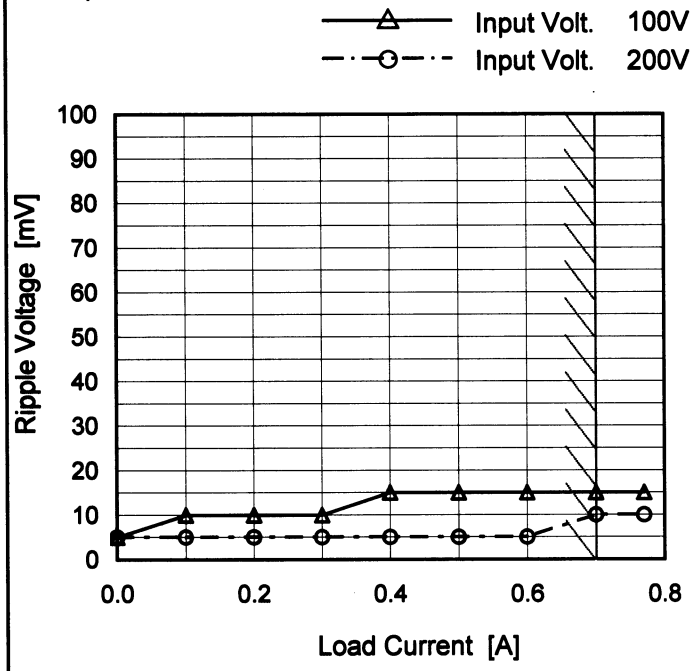
Fig. Complex Ripple Wave Form

COSEL

Model	PBW15F-12
Item	Ripple Voltage (by Load Current)
Object	-12V0.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Measured by 20 MHz Oscilloscope.
Ripple Voltage 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

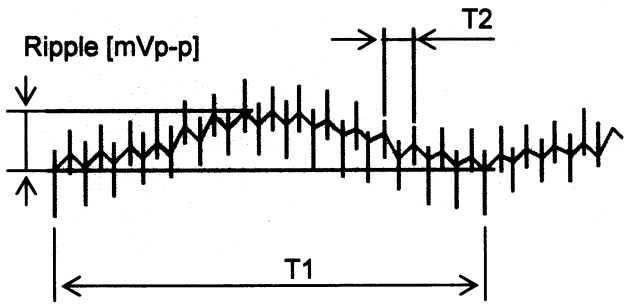


Fig. Complex Ripple Wave Form

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	5	5
0.10	10	5
0.20	10	5
0.30	10	5
0.40	15	5
0.50	15	5
0.60	15	5
0.70	15	10
0.77	15	10
--	-	-
--	-	-

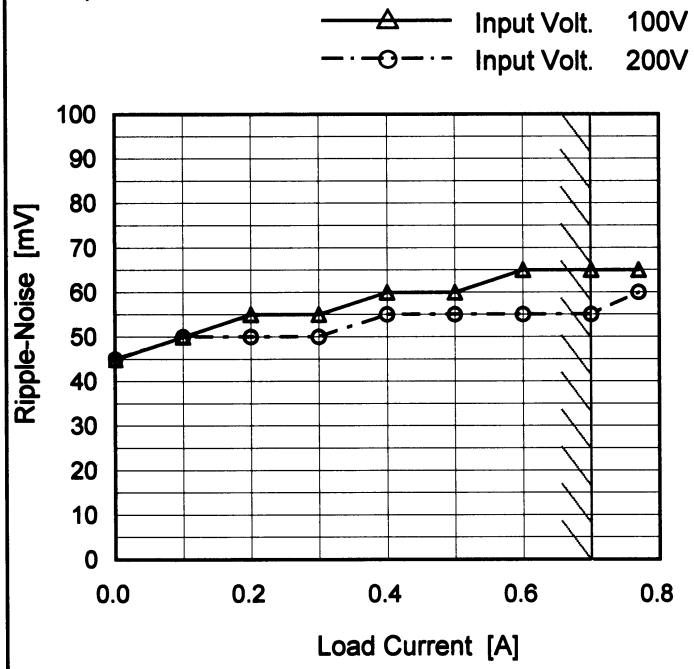
+12V: Rated output current 1

COSEL

Model	PBW15F-12
Item	Ripple-Noise
Object	+12V0.7A

Temperature 25°C
Testing Circuitry Figure A

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.

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	45	45
0.10	50	50
0.20	55	50
0.30	55	50
0.40	60	55
0.50	60	55
0.60	65	55
0.70	65	55
0.77	65	60
--	-	-
--	-	-

-12V: Rated output current 1

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

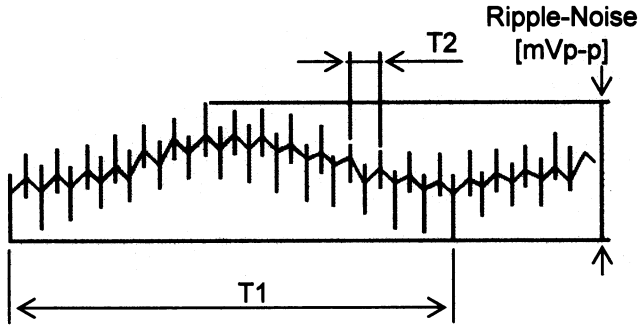


Fig. Complex Ripple Wave Form

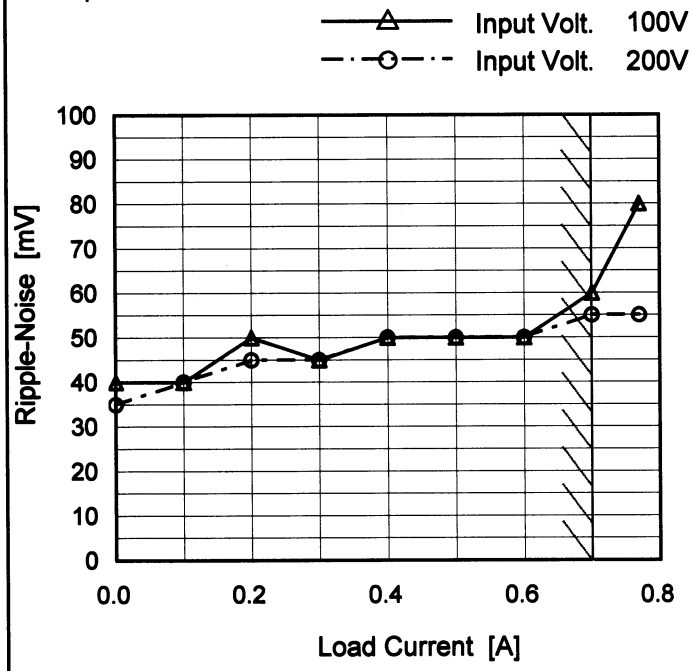
BC-10026

COSEL

Model	PBW15F-12
Item	Ripple-Noise
Object	-12V0.7A

Temperature 25°C
Testing Circuitry Figure A

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.

2.Values

Load Current [A]	Ripple-Noise [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	40	35
0.10	40	40
0.20	50	45
0.30	45	45
0.40	50	50
0.50	50	50
0.60	50	50
0.70	60	55
0.77	80	55
--	-	-
--	-	-

+12V: Rated output current 1

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

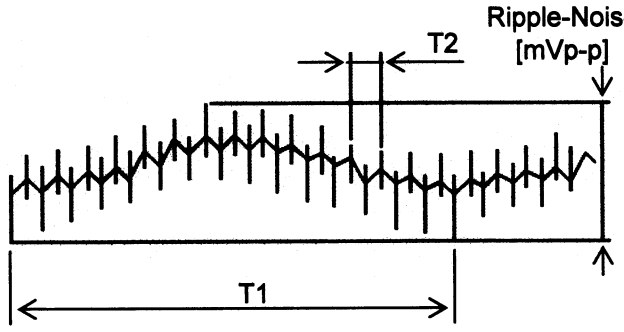


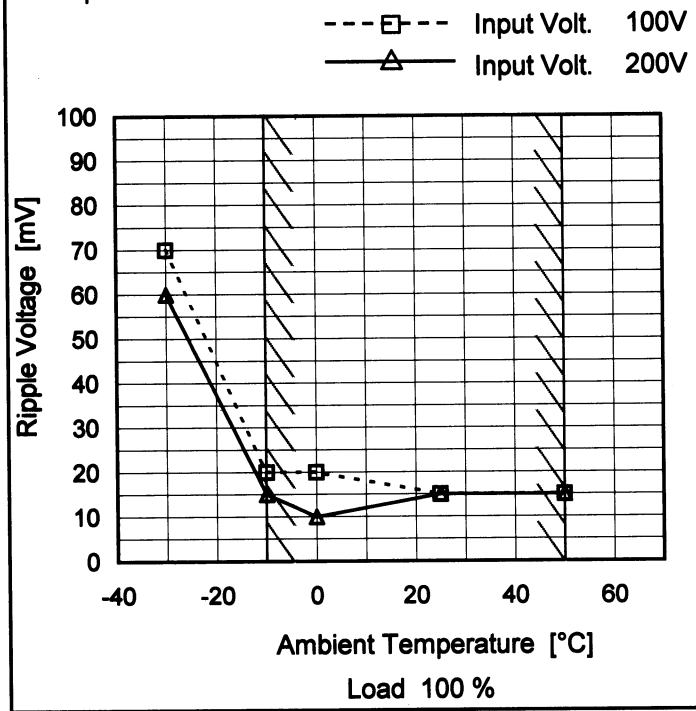
Fig. Complex Ripple Wave Form

COSEL

Model	PBW15F-12
Item	Ripple Voltage (by Ambient Temp.)
Object	+12V0.7A

Testing Circuitry Figure A

1.Graph



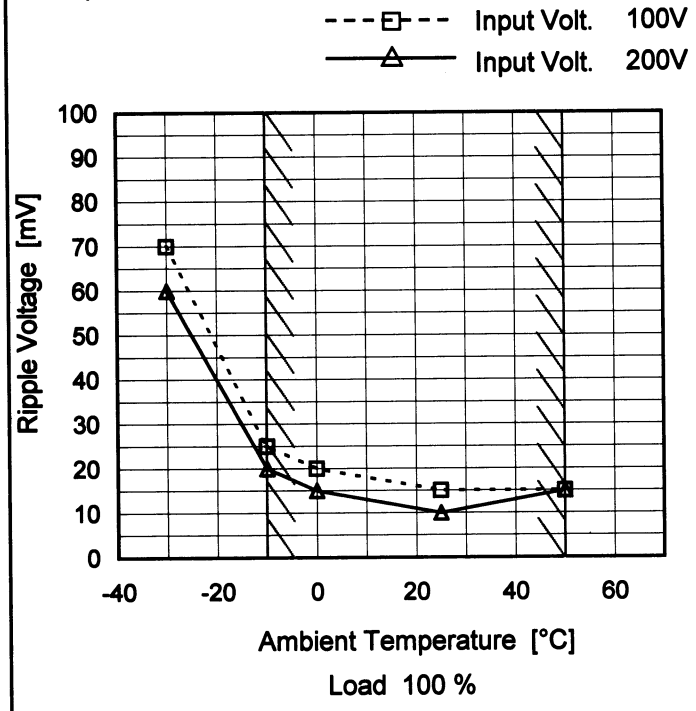
2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-30	70	60
-10	20	15
0	20	10
25	15	15
50	15	15
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

-12V: Rated output current 1

Object	-12V0.7A

1.Graph



Measured by 20 MHz Oscilloscope.

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

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
-30	70	60
-10	25	20
0	20	15
25	15	10
50	15	15
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

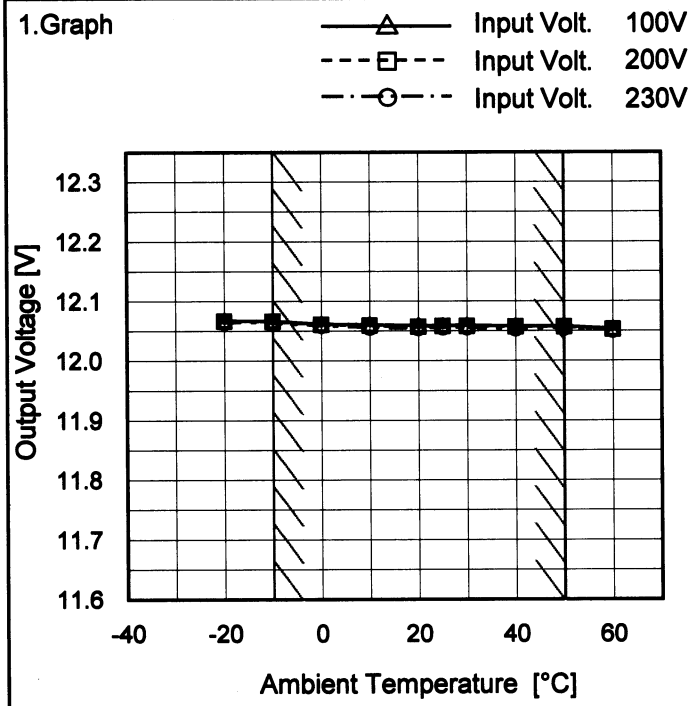
+12V: Rated output current 1

COSEL

Model	PBW15F-12
Item	Ambient Temperature Drift
Object	+12V0.7A

Testing Circuitry Figure A

1.Graph



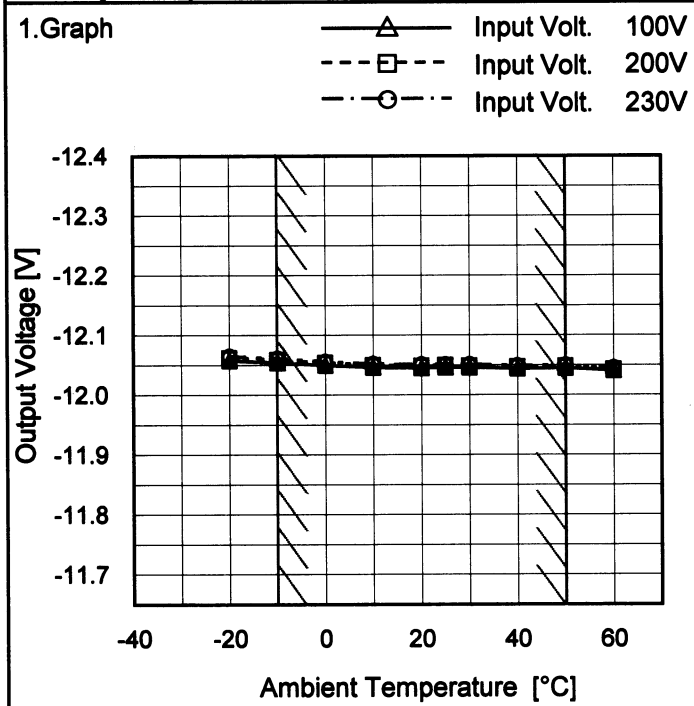
Load 100%

2.Values

Ambient Temperature [°C]	Output Voltage [V] Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
-20	12.068	12.067	12.065
-10	12.067	12.066	12.064
0	12.062	12.061	12.059
10	12.061	12.059	12.056
20	12.059	12.057	12.055
25	12.059	12.058	12.056
30	12.060	12.058	12.056
40	12.058	12.057	12.054
50	12.058	12.057	12.055
60	12.054	12.053	12.051
--	-	-	-

Object	-12V0.7A

1.Graph



Load 100%

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	-12.058	-12.062	-12.065
-10	-12.054	-12.059	-12.061
0	-12.050	-12.054	-12.056
10	-12.046	-12.050	-12.052
20	-12.045	-12.049	-12.051
25	-12.046	-12.050	-12.051
30	-12.046	-12.049	-12.051
40	-12.044	-12.047	-12.049
50	-12.045	-12.048	-12.050
60	-12.041	-12.043	-12.045
--	-	-	-

BC-10026

COSEL

Model	PBW15F-12	
Item	Output Voltage Accuracy	Testing Circuitry Figure A

1.Output Voltage Accuracy

This is defined as the value of the output voltage, regulation load, ambient temperature and input voltage varied at random in the range as specified below.

Temperature : -10 - 50°C
Input Voltage : 85 - 264V
Load Current (AVR 1) : 0 - 0.7A (AVR 2) : 0 - 0.7A

* Output Voltage Accuracy = ±(Maximum of Output Voltage - Minimum of Output Voltage) / 2

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

2.Values

Object	+12V0.7A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-10	85	0	12.234	±105	±0.9
Minimum Voltage	40	264	0.7	12.024		

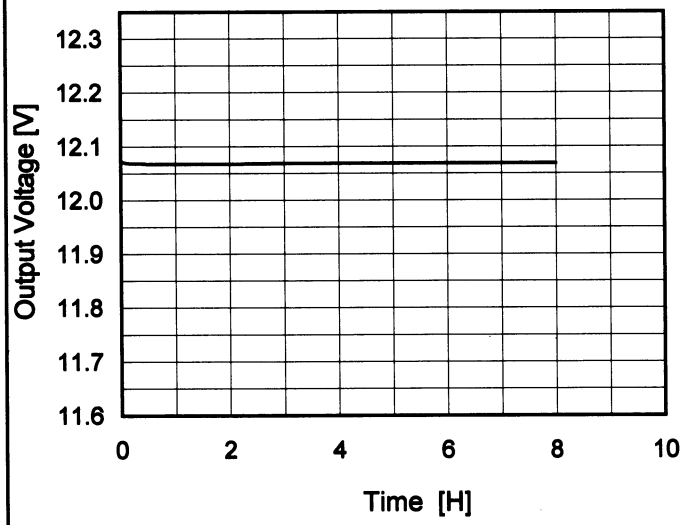
Object	-12V0.7A					
Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-10	85	0	-12.277	±132	±1.1
Minimum Voltage	50	85	0.7	-12.014		

COSEL

Model	PBW15F-12
Item	Time Lapse Drift
Object	+12V0.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



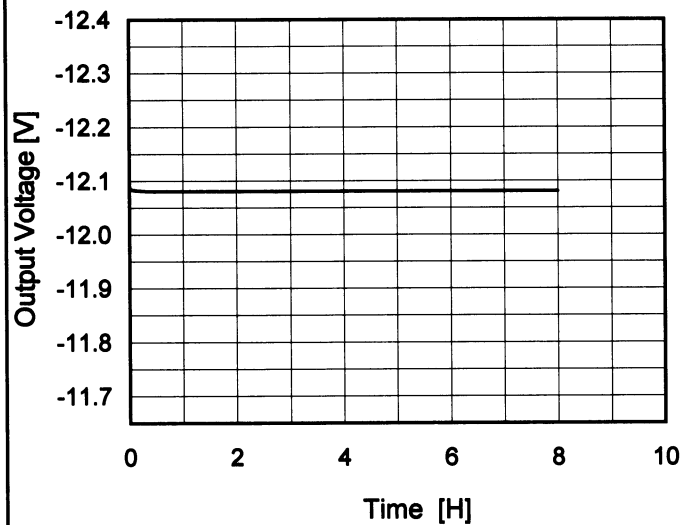
Input Volt. 100V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	12.073
0.5	12.068
1.0	12.068
2.0	12.068
3.0	12.069
4.0	12.069
5.0	12.069
6.0	12.069
7.0	12.069
8.0	12.069

Object	-12V0.7A

1.Graph



Input Volt. 100V
Load 100%

2.Values

Time since start [H]	Output Voltage [V]
0.0	-12.086
0.5	-12.081
1.0	-12.081
2.0	-12.081
3.0	-12.081
4.0	-12.081
5.0	-12.081
6.0	-12.081
7.0	-12.081
8.0	-12.081

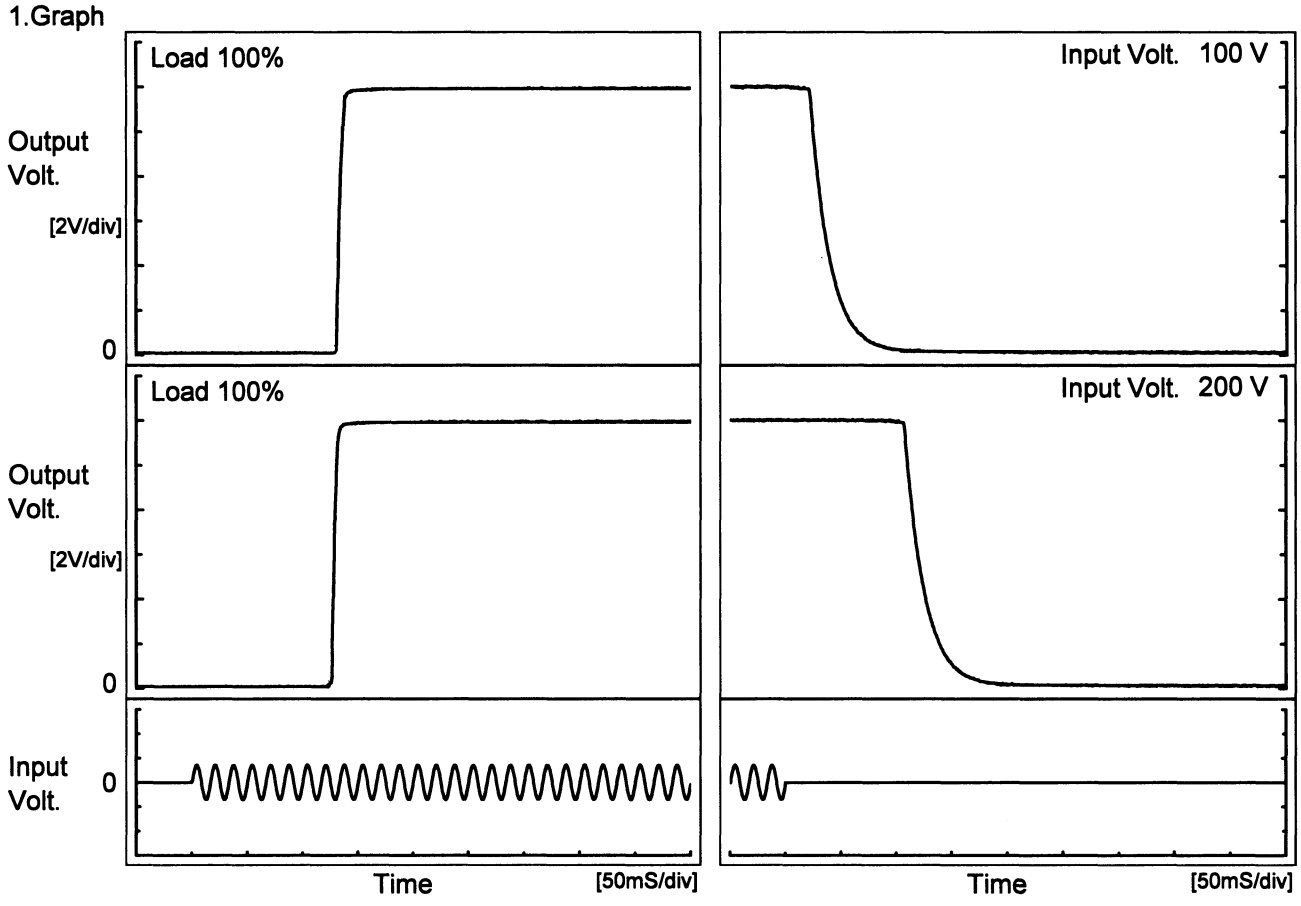
* The characteristic of AC200V is equal.

COSEL

Model	PBW15F-12
Item	Rise and Fall Time
Object	+12V0.7A

Temperature 25°C
Testing Circuitry Figure A

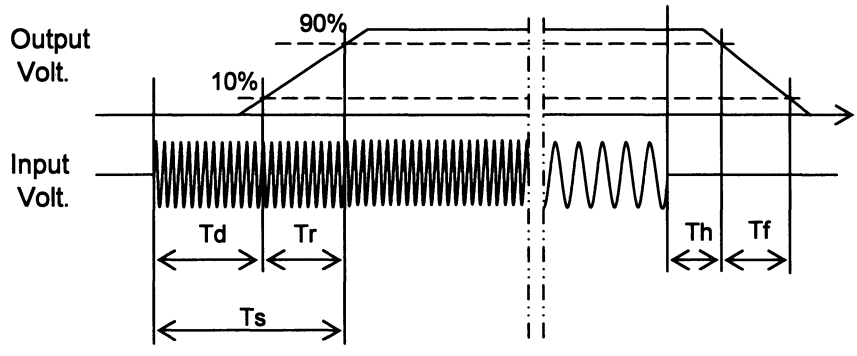
1.Graph



2.Values

[mS]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	131.0	6.5	137.5	22.8	38.0
200 V	126.5	5.5	132.0	108.5	38.8

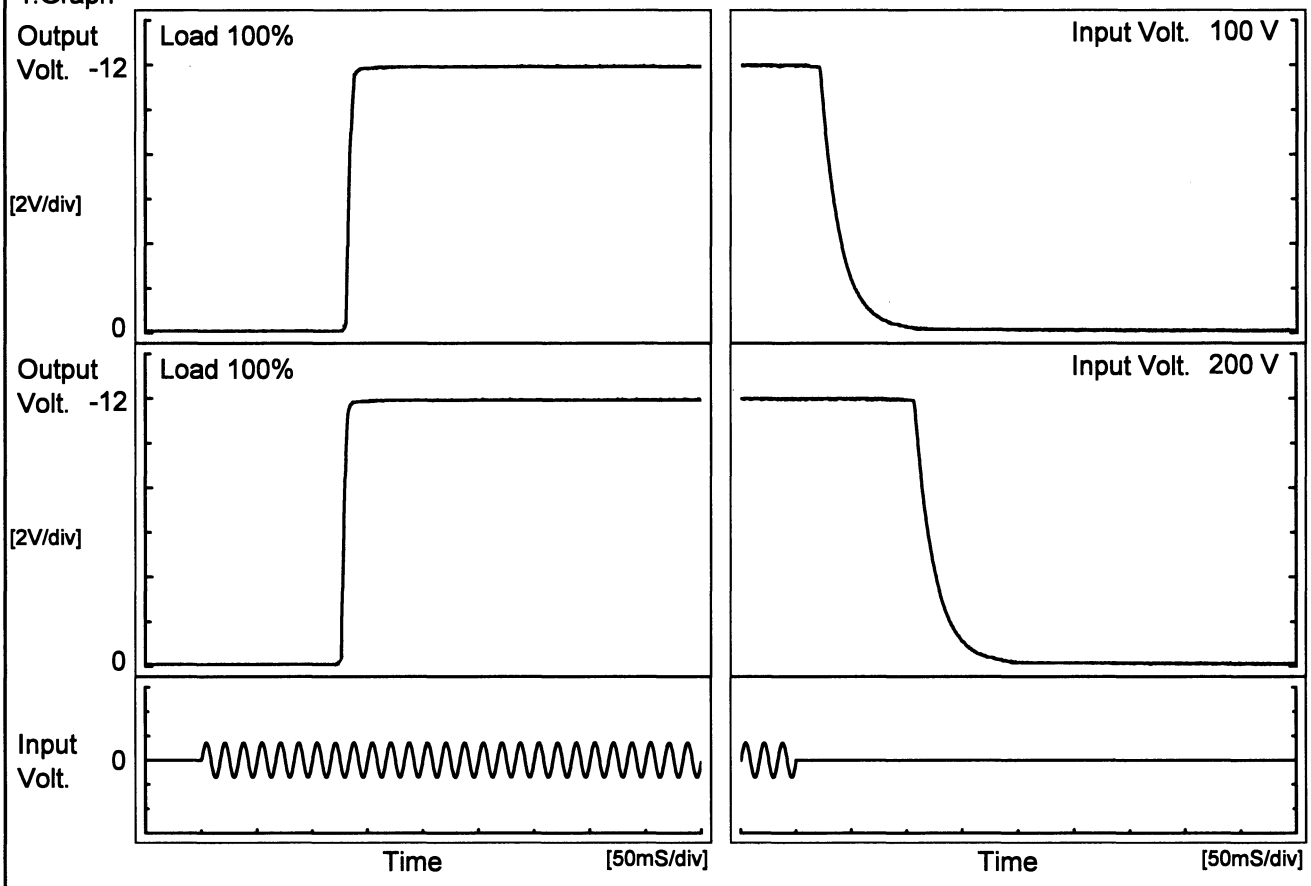


BC-10026

COSEL

Model	PBW15F-12	
Item	Rise and Fall Time	Temperature 25°C Testing Circuitry Figure A
Object	-12V0.7A	

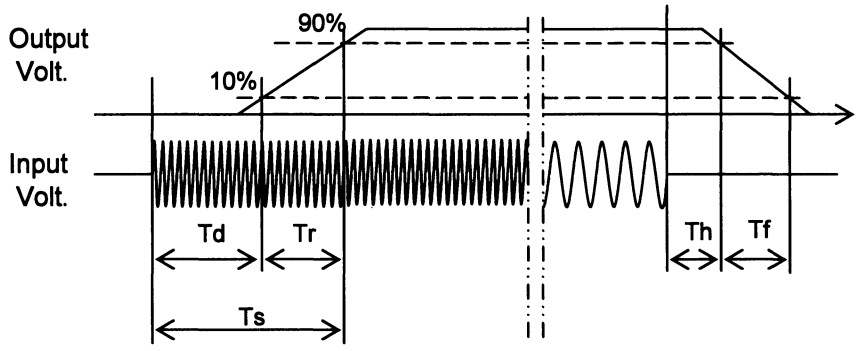
1.Graph



2.Values

[mS]

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	131.3	6.5	173.8	22.8	38.0
200 V	126.3	5.5	131.8	108.3	38.8

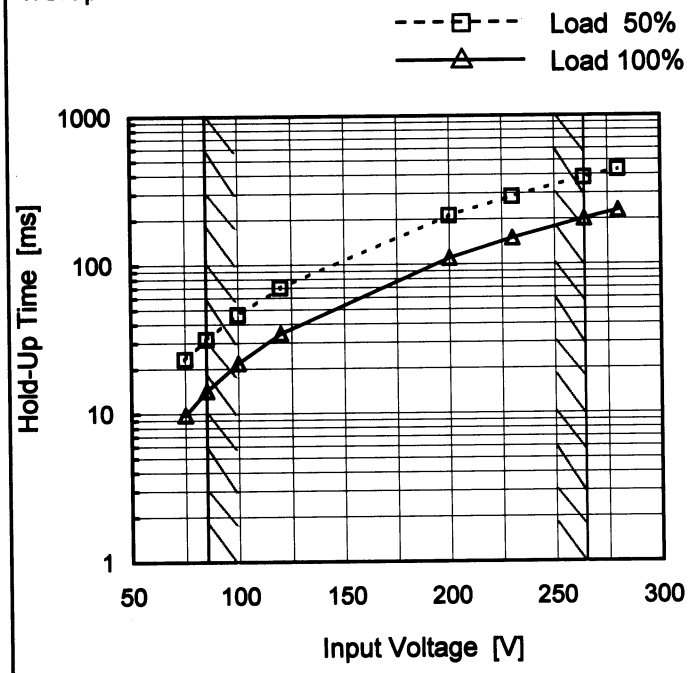


COSEL

Model	PBW15F-12
Item	Hold-Up Time
Object	+12V0.7A

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

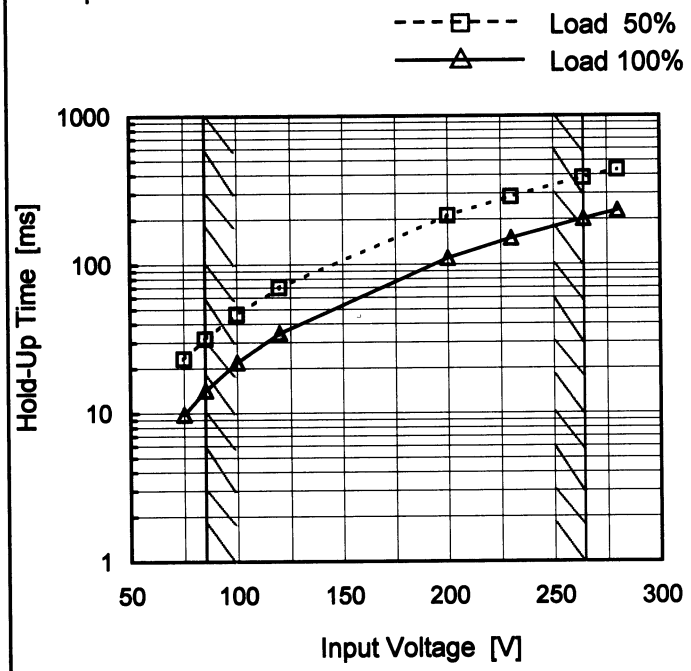
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
75	23	10
85	32	14
100	46	22
120	70	35
200	213	111
230	286	150
264	381	202
280	432	230
--	-	-

COSEL

Model	PBW15F-12
Item	Hold-Up Time
Object	-12V0.7A

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

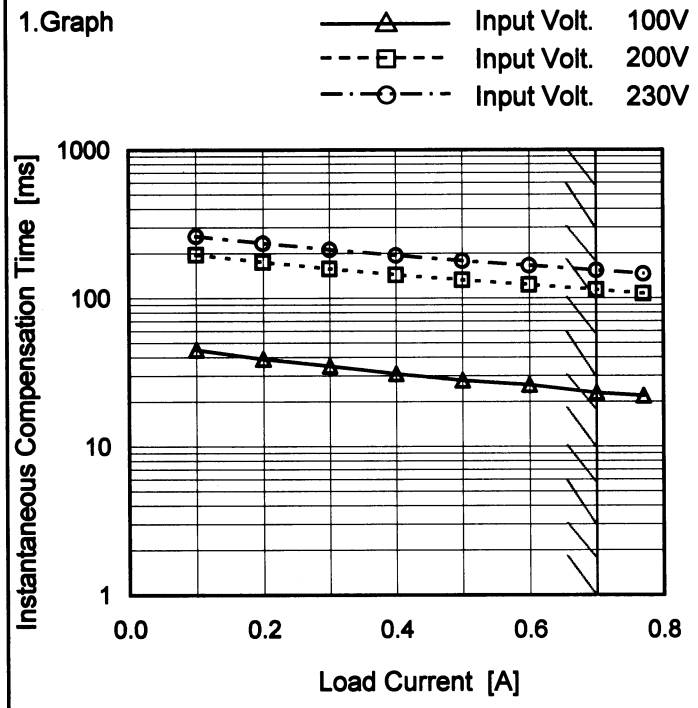
Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
75	23	10
85	32	14
100	46	22
120	70	35
200	213	111
230	286	150
264	381	202
280	432	230
--	-	-

COSEL

Model	PBW15F-12
Item	Instantaneous Interruption Compensation
Object	+12V0.7A

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	-	-	-
0.10	45	196	262
0.20	39	175	235
0.30	35	158	213
0.40	31	144	194
0.50	28	133	179
0.60	26	123	166
0.70	23	114	154
0.77	22	107	146
--	-	-	-
--	-	-	-

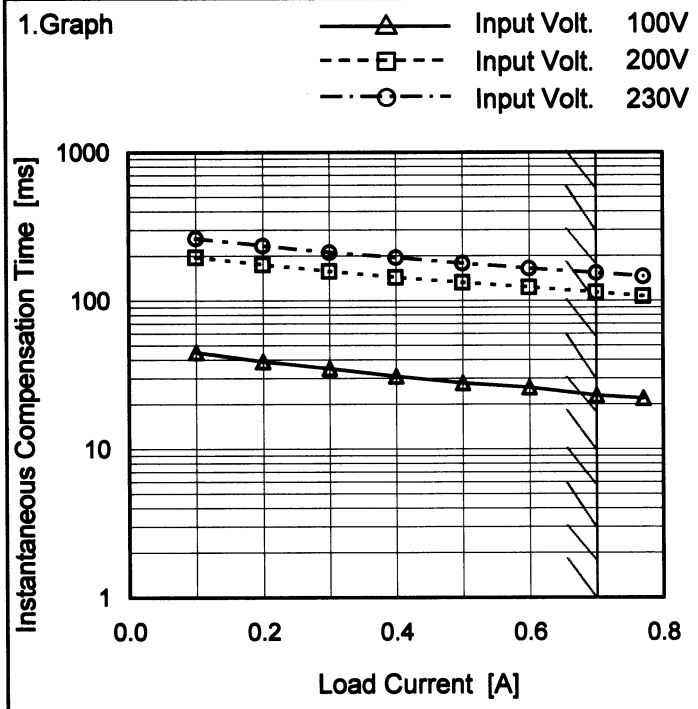
-12V: Rated output current 1

COSEL

Model	PBW15F-12
Item	Instantaneous Interruption Compensation
Object	-12V0.7A

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	-	-	-
0.10	45	196	263
0.20	39	175	235
0.30	35	158	212
0.40	31	144	195
0.50	28	133	179
0.60	26	123	165
0.70	23	114	154
0.77	22	107	146
--	-	-	-
--	-	-	-

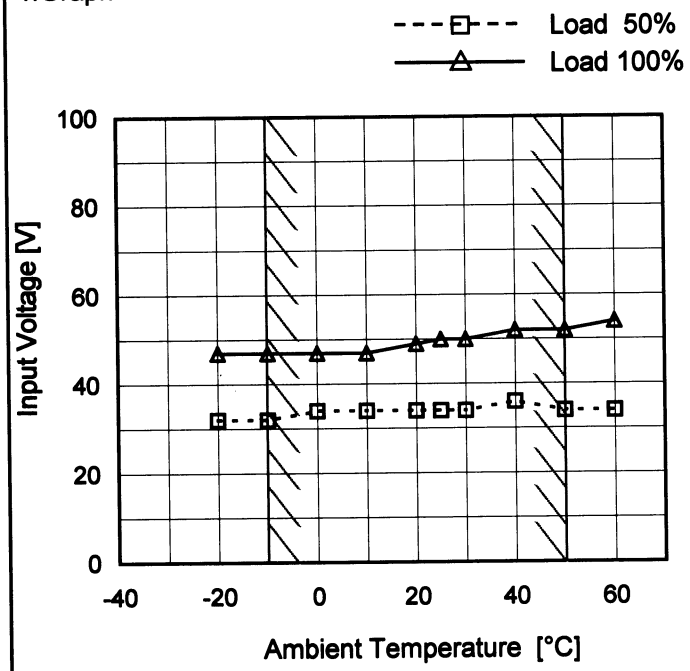
+12V: Rated output current 1

COSEL

Model	PBW15F-12
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+12V0.7A

Testing Circuitry Figure A

1.Graph

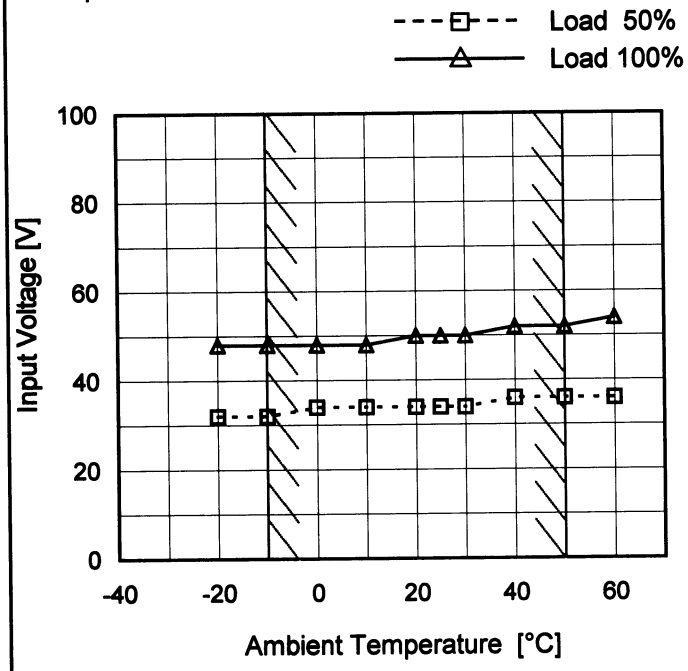


2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	32	47
-10	32	47
0	34	47
10	34	47
20	34	49
25	34	50
30	34	50
40	36	52
50	34	52
60	34	54
--	-	-

Object	-12V0.7A

1.Graph



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

2.Values

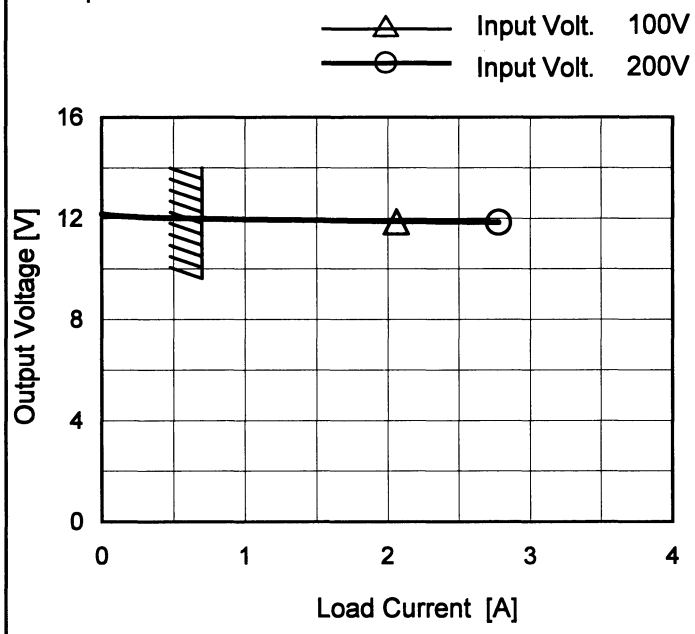
Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	32	48
-10	32	48
0	34	48
10	34	48
20	34	50
25	34	50
30	34	50
40	36	52
50	36	52
60	36	54
--	-	-

COSEL

Model	PBW15F-12
Item	Overcurrent Protection
Object	+12V0.7A

Temperature 25°C
Testing Circuitry Figure A

1.Graph



Intermittent operation occurs when the output voltage is less than rated output voltage.

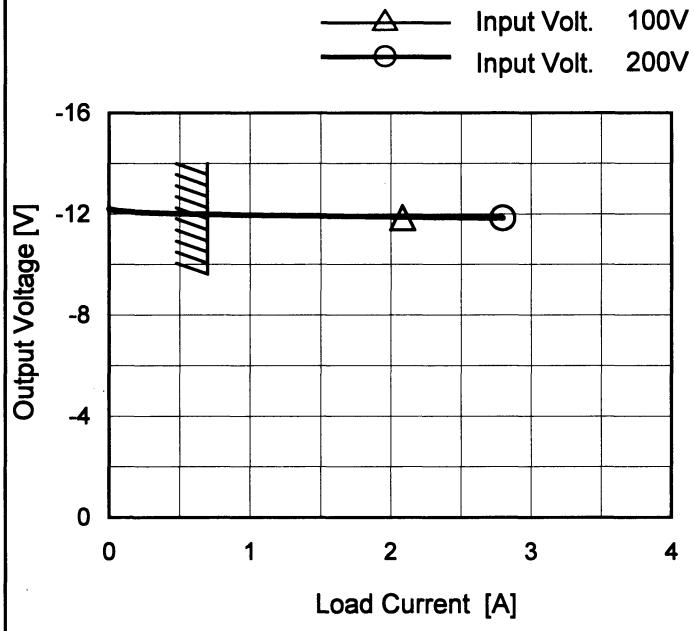
2.Values

Output Voltage [V]	Load Current [A] Input Volt. 100[V]	Load Current [A] Input Volt. 200[V]
12.0	2.06	2.78
11.4	-	-
10.8	-	-
9.6	-	-
8.4	-	-
7.2	-	-
6.0	-	-
4.8	-	-
3.6	-	-
2.4	-	-
1.2	-	-
0.0	-	-

-12V: Rated output current 1

Object	-12V0.7A

1.Graph



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

Intermittent operation occurs when the output voltage is less than rated output voltage.

2.Values

Output Voltage [V]	Load Current [A] Input Volt. 100[V]	Load Current [A] Input Volt. 200[V]
-12.0	2.08	2.80
-11.4	-	-
-10.8	-	-
-9.6	-	-
-8.4	-	-
-7.2	-	-
-6.0	-	-
-4.8	-	-
-3.6	-	-
-2.4	-	-
-1.2	-	-
0.0	-	-

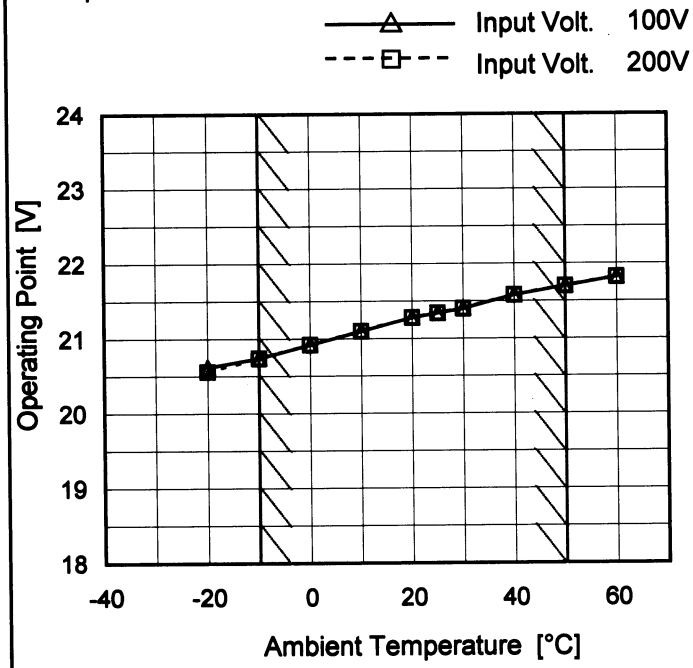
+12V: Rated output current 1

COSEL

Model	PBW15F-12
Item	Overvoltage Protection
Object	+12V0.7A

Testing Circuitry Figure A

1.Graph

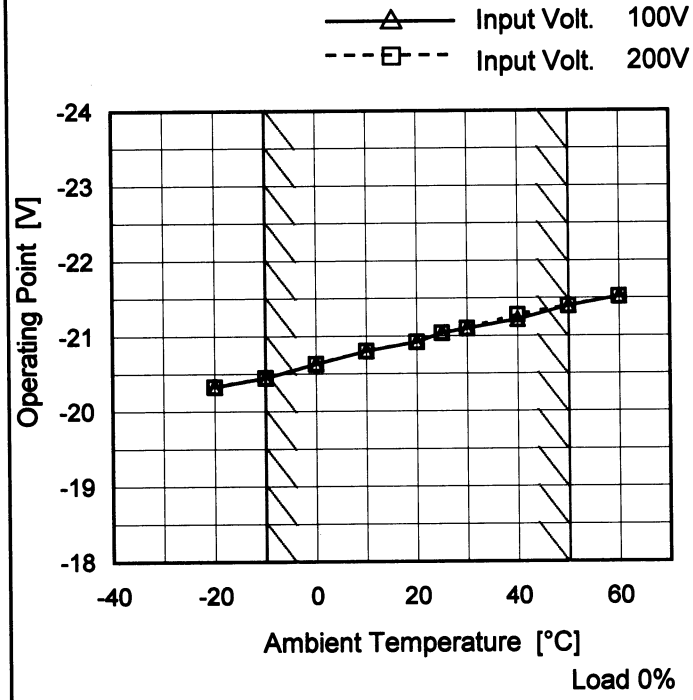


2.Values

Ambient Temperature [°C]	Operating Point [V]	
	Input Volt. 100[V]	Input Volt. 200[V]
-20	20.62	20.56
-10	20.74	20.74
0	20.92	20.92
10	21.10	21.10
20	21.28	21.28
25	21.34	21.34
30	21.40	21.40
40	21.58	21.58
50	21.70	21.70
60	21.82	21.82
--	-	-

Object	-12V0.7A

1.Graph



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. 200[V]
-20	-20.33	-20.33
-10	-20.45	-20.45
0	-20.63	-20.63
10	-20.80	-20.80
20	-20.92	-20.92
25	-21.04	-21.04
30	-21.10	-21.10
40	-21.22	-21.28
50	-21.40	-21.40
60	-21.52	-21.52
--	-	-

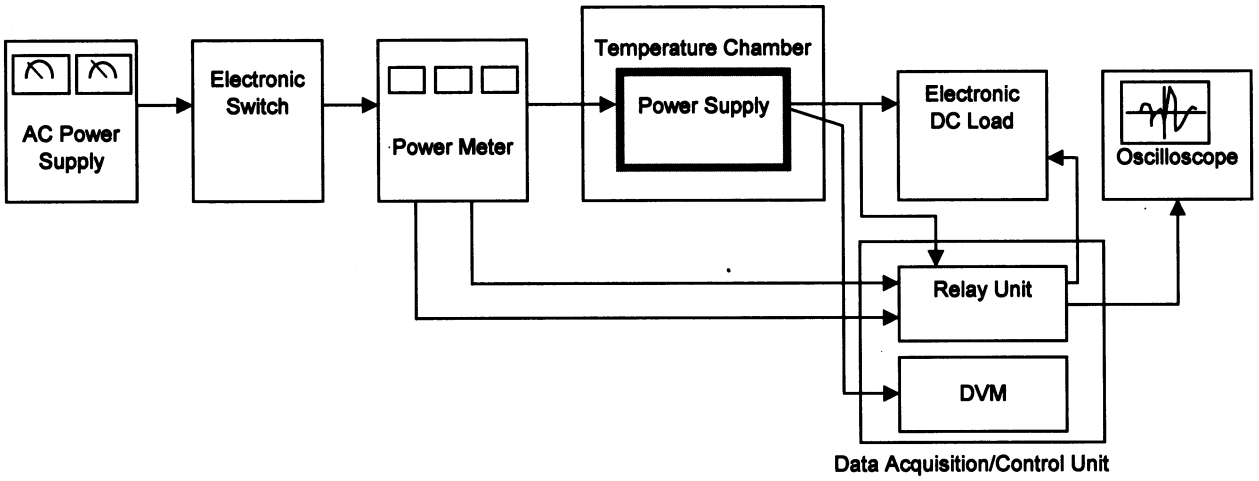


Figure A

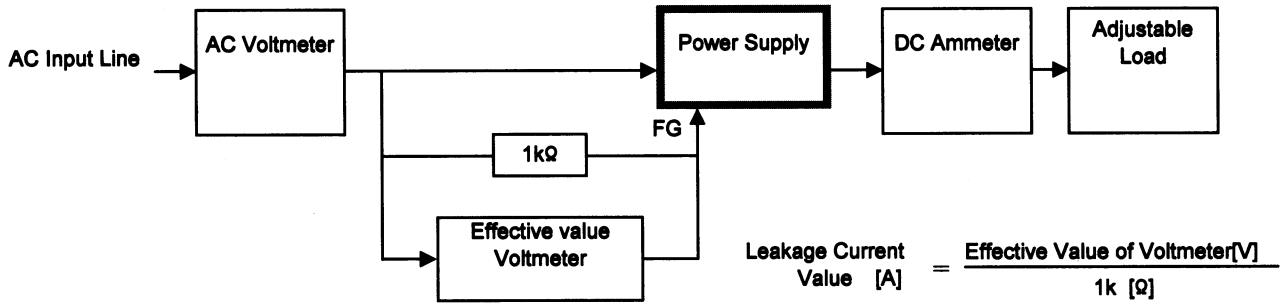


Figure B (DEN-AN)

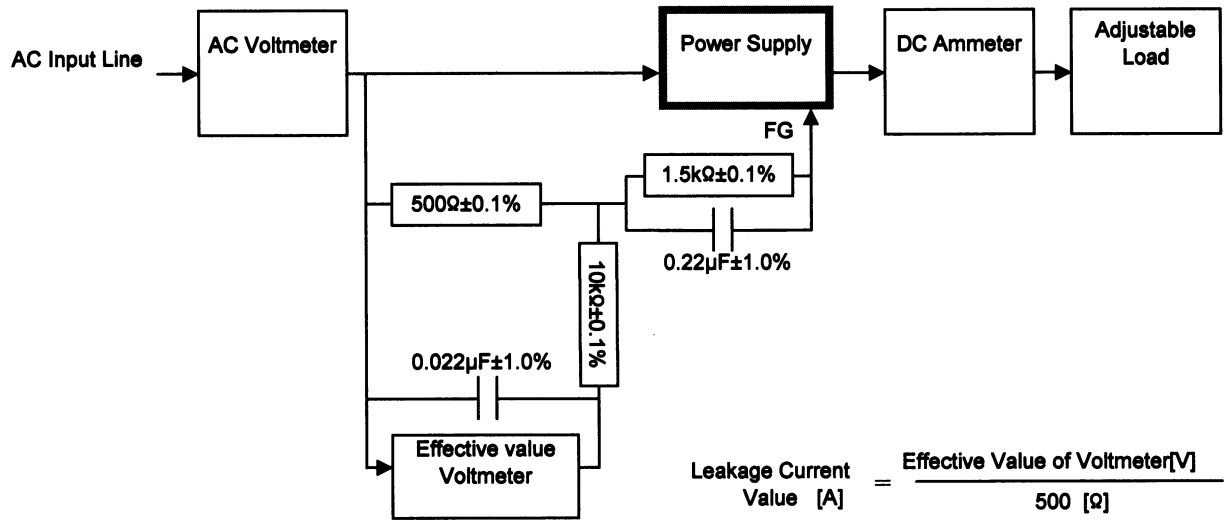


Figure B (IEC60950)