

# TEST DATA OF SPLFA30F-12

Regulated DC Power Supply  
May 18, 2011

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Prepared by : Hiroaki Kitamura  
Hiroaki Kitamura Design Engineer

**COSEL CO.,LTD.**

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(Final Page 24)

Model

SPLFA30F-12

Item

Input Current (by Load Current)

Object

1.Graph

—△—

Input Volt.

100V

---□---

Input Volt.

200V

-○-

Input Volt.

230V

Input Current [A]

1.0

0.8

0.6

0.4

0.2

0.0

0.0

1.0

2.0

3.0

Load Current [A]

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	0.030	0.028	0.029
0.40	0.129	0.091	0.085
0.80	0.224	0.144	0.131
1.20	0.315	0.195	0.180
1.60	0.407	0.246	0.225
2.00	0.500	0.297	0.271
2.40	0.593	0.348	0.316
2.50	0.617	0.362	0.328
2.75	0.675	0.394	0.356
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- 1 -

BC - 10563

Model		SPLFA30F-12		Temperature		25°C																																																				
Item		Input Power (by Load Current)		Testing Circuitry		Figure A																																																				
Object																																																										
1.Graph				2.Values																																																						
<div><div><div><div><div></div><div>—△—</div></div><div>Input Volt.</div><div>100V</div></div><div><div><div></div><div>---□---</div></div><div>Input Volt.</div><div>200V</div></div><div><div><div></div><div>-○-</div></div><div>Input Volt.</div><div>230V</div></div></div><div><p>Input Power [W]</p><p>Load Current [A]</p></div></div>				<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Input Power [W]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>1.10</td><td>1.50</td><td>1.50</td></tr><tr><td>0.40</td><td>6.50</td><td>7.30</td><td>7.60</td></tr><tr><td>0.80</td><td>12.40</td><td>12.90</td><td>12.90</td></tr><tr><td>1.20</td><td>18.20</td><td>18.50</td><td>18.80</td></tr><tr><td>1.60</td><td>23.90</td><td>24.00</td><td>24.20</td></tr><tr><td>2.00</td><td>29.80</td><td>29.50</td><td>29.80</td></tr><tr><td>2.40</td><td>35.80</td><td>35.20</td><td>35.30</td></tr><tr><td>2.50</td><td>37.30</td><td>36.60</td><td>36.70</td></tr><tr><td>2.75</td><td>41.20</td><td>40.10</td><td>40.20</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 Power [W]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.00	1.10	1.50	1.50	0.40	6.50	7.30	7.60	0.80	12.40	12.90	12.90	1.20	18.20	18.50	18.80	1.60	23.90	24.00	24.20	2.00	29.80	29.50	29.80	2.40	35.80	35.20	35.30	2.50	37.30	36.60	36.70	2.75	41.20	40.10	40.20	--	-	-	-	--	-	-	-
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-2-

BC - 10563

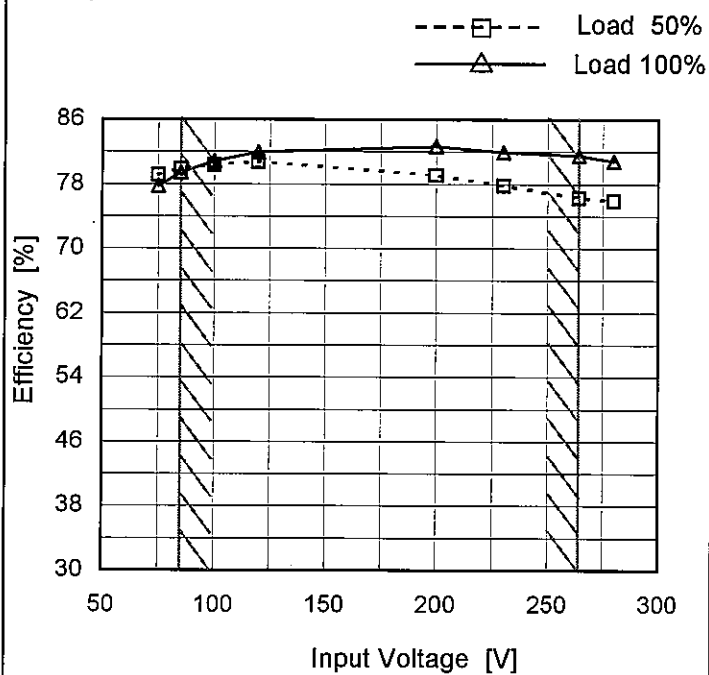
Model SPLFA30F-12

Item Efficiency (by Input Voltage)

Object

Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph

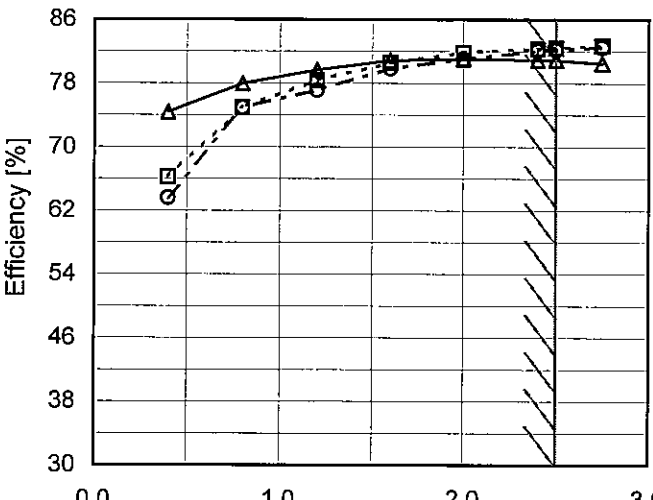


Note: Slanted line shows the range of the rated input voltage.

## 2. Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
75	79.1	77.8
85	79.9	79.4
100	80.3	80.9
120	80.8	82.0
200	79.1	82.6
230	77.8	82.0
264	76.3	81.5
280	75.9	80.8
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Model		SPLFA30F-12		Temperature 25°C																																																				
Item		Efficiency (by Load Current)		Testing Circuitry Figure A																																																				
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1.Graph		<div><div><div>—△—</div><div>Input Volt.</div><div>100V</div></div><div><div>---□---</div><div>Input Volt.</div><div>200V</div></div><div><div>---○---</div><div>Input Volt.</div><div>230V</div></div></div> 		2.Values																																																				
		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Efficiency [%]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>-</td><td>-</td><td>-</td></tr><tr><td>0.40</td><td>74.4</td><td>66.2</td><td>63.6</td></tr><tr><td>0.80</td><td>78.0</td><td>74.9</td><td>74.9</td></tr><tr><td>1.20</td><td>79.7</td><td>78.4</td><td>77.1</td></tr><tr><td>1.60</td><td>80.9</td><td>80.5</td><td>79.8</td></tr><tr><td>2.00</td><td>81.0</td><td>81.8</td><td>81.0</td></tr><tr><td>2.40</td><td>80.9</td><td>82.3</td><td>82.1</td></tr><tr><td>2.50</td><td>80.9</td><td>82.4</td><td>82.2</td></tr><tr><td>2.75</td><td>80.5</td><td>82.7</td><td>82.5</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]	Efficiency [%]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.00	-	-	-	0.40	74.4	66.2	63.6	0.80	78.0	74.9	74.9	1.20	79.7	78.4	77.1	1.60	80.9	80.5	79.8	2.00	81.0	81.8	81.0	2.40	80.9	82.3	82.1	2.50	80.9	82.4	82.2	2.75	80.5	82.7	82.5	--	-	-	-	--	-	-	-
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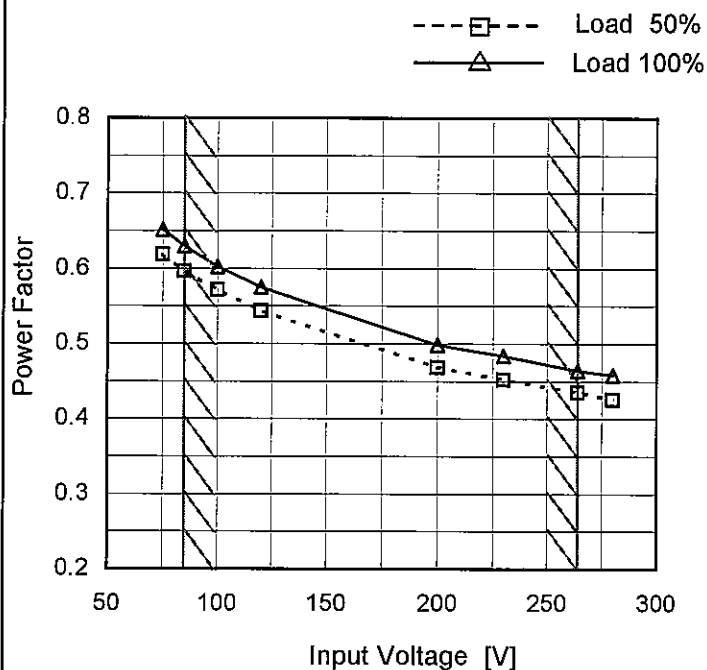
Model SPLFA30F-12

Item Power Factor (by Input Voltage)

Object

Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



## 2. Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
75	0.618	0.652
85	0.596	0.629
100	0.571	0.603
120	0.544	0.575
200	0.468	0.499
230	0.452	0.484
264	0.435	0.464
280	0.426	0.458
--	-	-

Model

SPLFA30F-12

Item

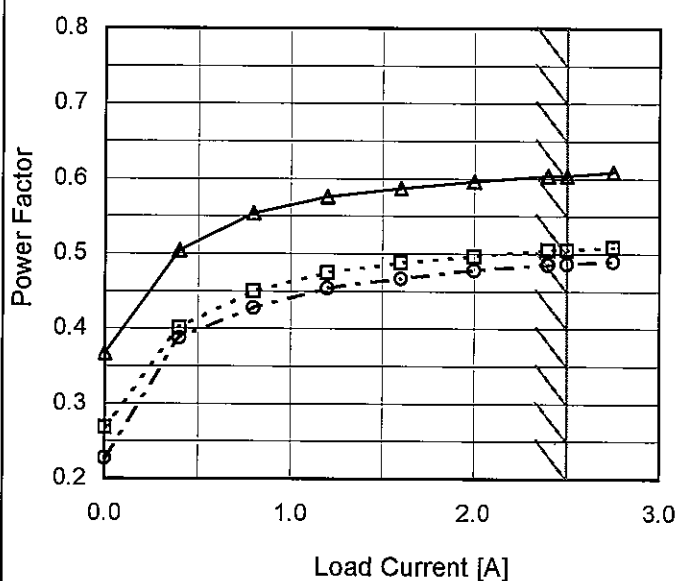
Power Factor (by Load Current)

Object

 Temperature 25°C  
 Testing Circuitry Figure A

## 1. Graph

—△— Input Volt. 100V  
 ---□--- Input Volt. 200V  
 -○- Input Volt. 230V



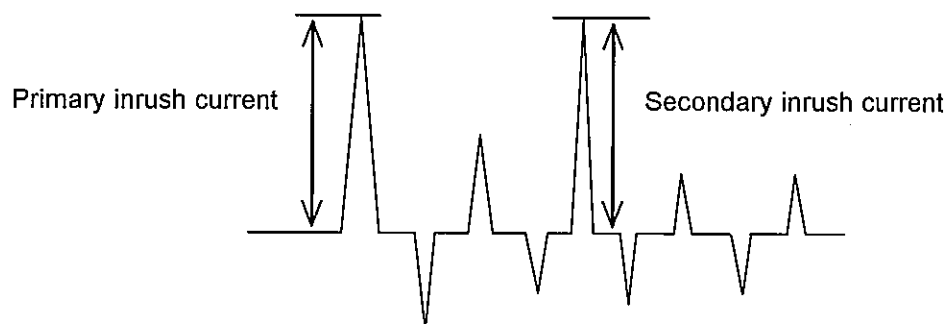
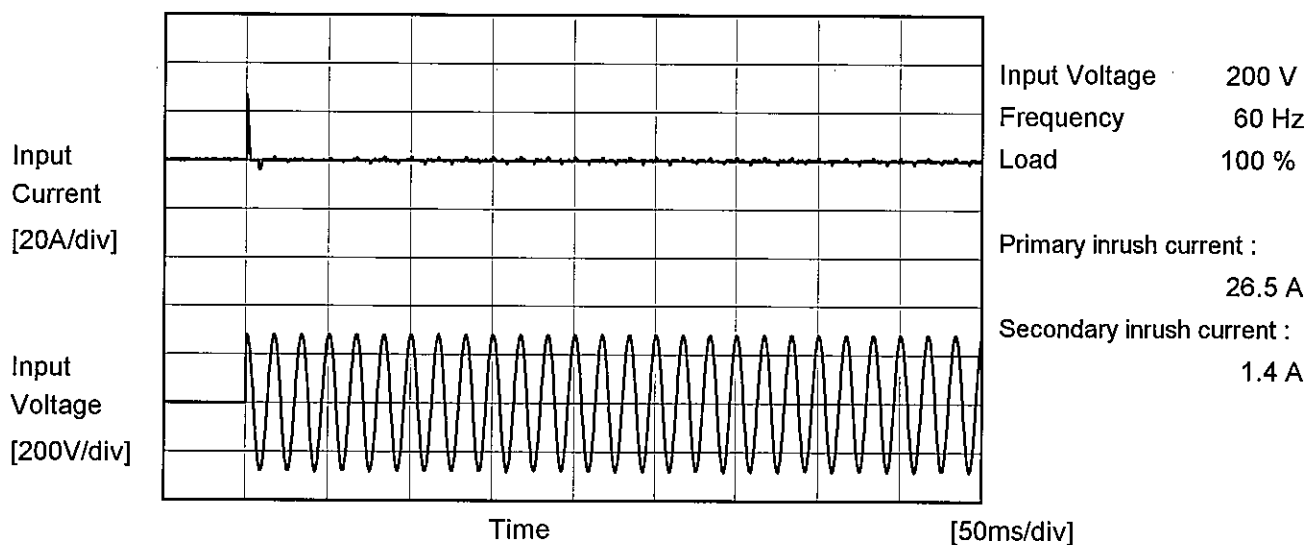
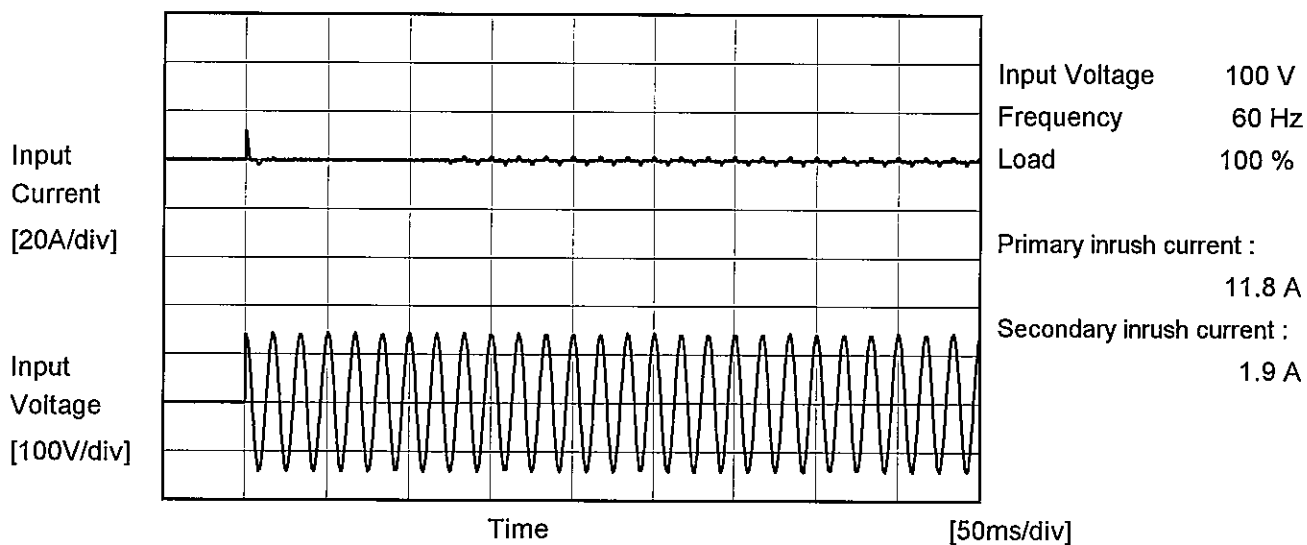
Note: Slanted line shows the range of the rated load current.

## 2. Values

Load Current [A]	Power Factor		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.00	0.367	0.268	0.227
0.40	0.504	0.401	0.388
0.80	0.554	0.449	0.427
1.20	0.576	0.474	0.454
1.60	0.587	0.488	0.467
2.00	0.596	0.497	0.478
2.40	0.604	0.505	0.486
2.50	0.604	0.506	0.486
2.75	0.609	0.509	0.490
--	-	-	-
--	-	-	-



Model	SPLFA30F-12	Temperature Testing Circuitry	25°C Figure A
Item	Inrush Current		
Object			



		Temperature 25°C Testing Circuitry Figure B
Model	SPLFA30F-12	
Item	Leakage Current	
Object		

## 1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
DEN-AN	Both phases	0.15	0.25	0.34	Operation
	One of phases	0.20	0.48	0.53	Stand by
IEC60950-1	Both phases	0.15	0.28	0.39	Operation
	One of phases	0.20	0.49	0.54	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.

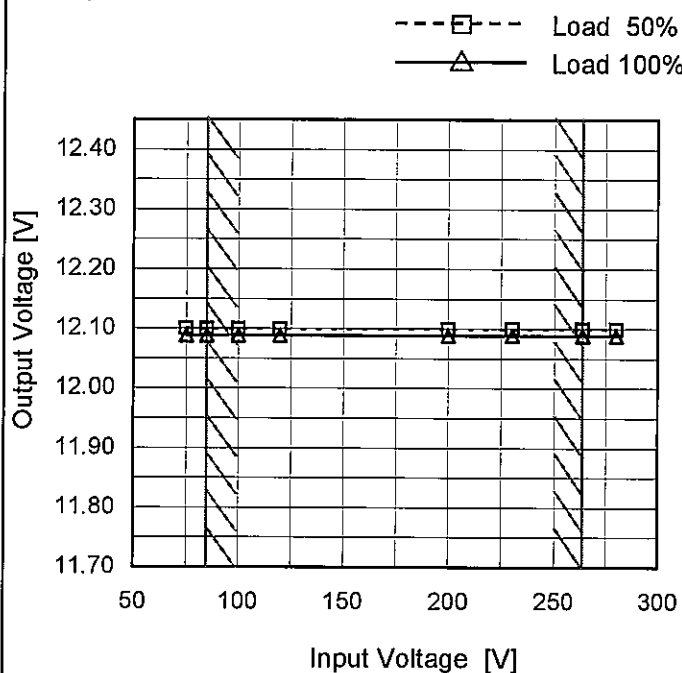
Model SPLFA30F-12

Item Line Regulation

Object +12V2.5A

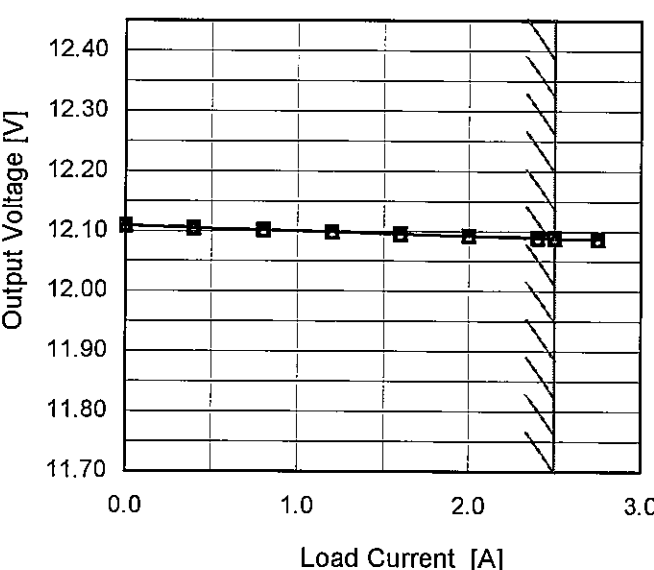
Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



## 2. Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
75	12.100	12.089
85	12.100	12.088
100	12.100	12.089
120	12.099	12.089
200	12.099	12.089
230	12.099	12.089
264	12.099	12.089
280	12.099	12.089
--	-	-

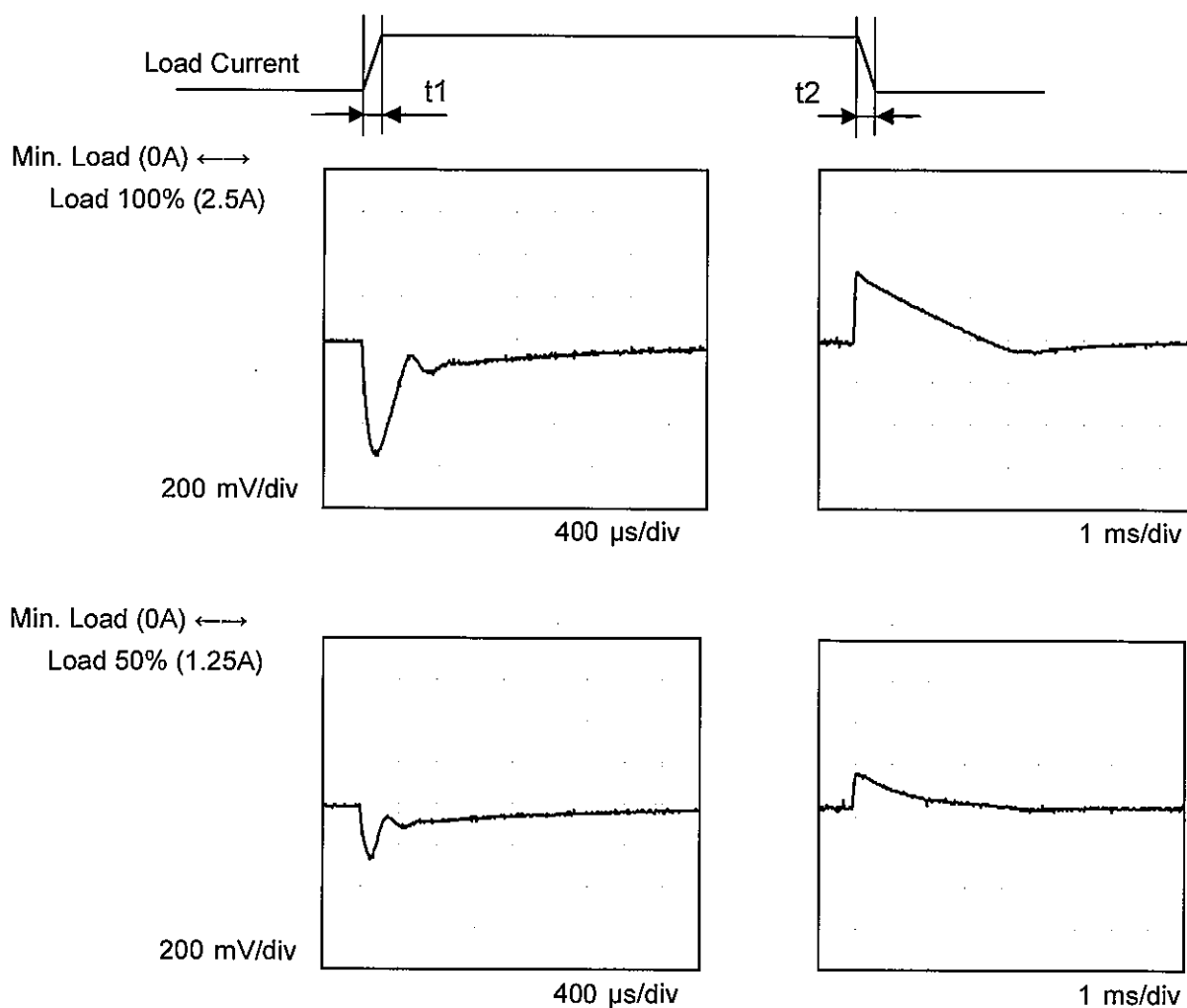
Model	SPLFA30F-12																																																					
Item	Load Regulation	Temperature	25°C																																																			
Object	+12V2.5A	Testing Circuitry	Figure A																																																			
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<div><div><div>—△—</div><div>Input Volt.</div><div>100V</div></div><div><div>---□---</div><div>Input Volt.</div><div>200V</div></div><div><div>---○---</div><div>Input Volt.</div><div>230V</div></div></div>  <p>Note: Slanted line shows the range of the rated load current.</p>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="3">Output Voltage [V]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th><th>Input Volt. 230[V]</th></tr><tr><td>0.00</td><td>12.109</td><td>12.109</td><td>12.109</td></tr><tr><td>0.40</td><td>12.105</td><td>12.105</td><td>12.105</td></tr><tr><td>0.80</td><td>12.102</td><td>12.102</td><td>12.102</td></tr><tr><td>1.20</td><td>12.099</td><td>12.099</td><td>12.099</td></tr><tr><td>1.60</td><td>12.096</td><td>12.096</td><td>12.096</td></tr><tr><td>2.00</td><td>12.092</td><td>12.093</td><td>12.093</td></tr><tr><td>2.40</td><td>12.089</td><td>12.089</td><td>12.089</td></tr><tr><td>2.50</td><td>12.088</td><td>12.089</td><td>12.089</td></tr><tr><td>2.75</td><td>12.086</td><td>12.087</td><td>12.087</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]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.00	12.109	12.109	12.109	0.40	12.105	12.105	12.105	0.80	12.102	12.102	12.102	1.20	12.099	12.099	12.099	1.60	12.096	12.096	12.096	2.00	12.092	12.093	12.093	2.40	12.089	12.089	12.089	2.50	12.088	12.089	12.089	2.75	12.086	12.087	12.087	--	-	-	-	--	-	-	-
Load Current [A]	Output Voltage [V]																																																					
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Model	SPLFA30F-12	Temperature	25°C
Item	Dynamic Load Response	Testing Circuitry	Figure A
Object	+12V2.5A		

Input Volt. 100 V  
Cycle 1000 ms

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



Model		SPLFA30F-12	
Item		Ripple Voltage (by Load Current)	
Object		+12V2.5A	
1.Graph		2.Values	

—△— Input Volt. 100V  
-·-○-·- Input Volt. 200V

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 100 [V]	Input Volt. 200 [V]
0.00	15	20
0.50	20	20
1.00	20	20
1.50	25	25
2.00	30	30
2.50	30	30
2.75	35	30
--	-	-
--	-	-
--	-	-
--	-	-

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

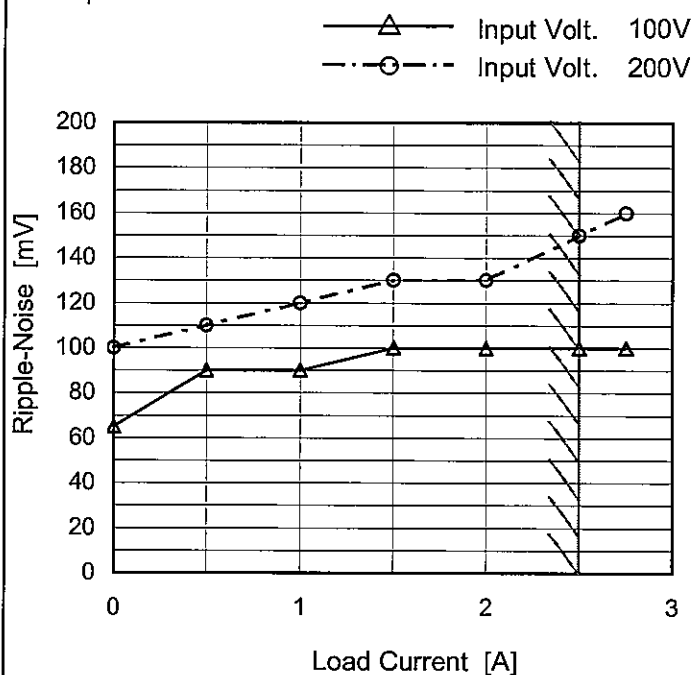
T1: Due to AC Input Line  
T2: Due to Switching

Fig. Complex Ripple Wave Form

Model	SPLFA30F-12
Item	Ripple-Noise
Object	+12V2.5A

Temperature 25°C  
Testing Circuitry Figure A

## 1. Graph



Measured by 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	65	100
0.50	90	110
1.00	100	120
1.50	100	130
2.00	100	130
2.50	100	150
2.75	100	160
--	-	-
--	-	-
--	-	-
--	-	-

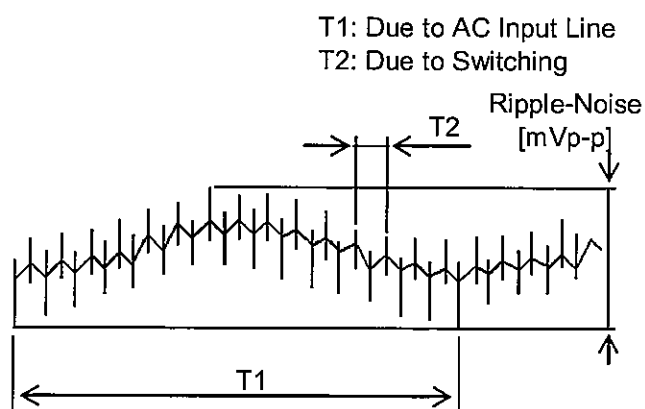
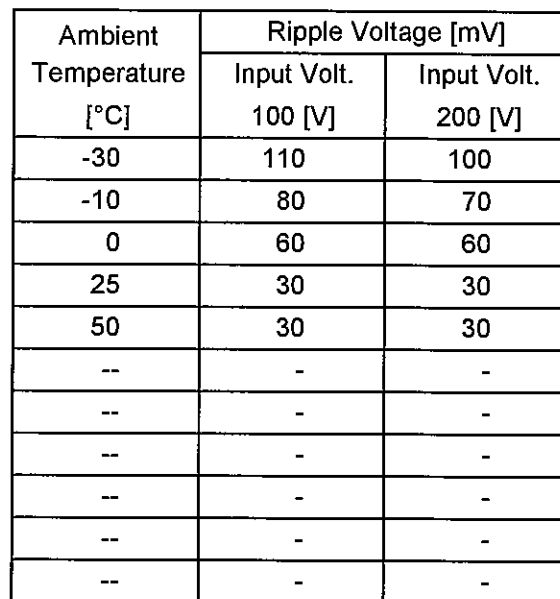


Fig. Complex Ripple Wave Form

Testing Circuitry Figure A

## 2.Values



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



Model

SPLFA30F-12

Item

Ambient Temperature Drift

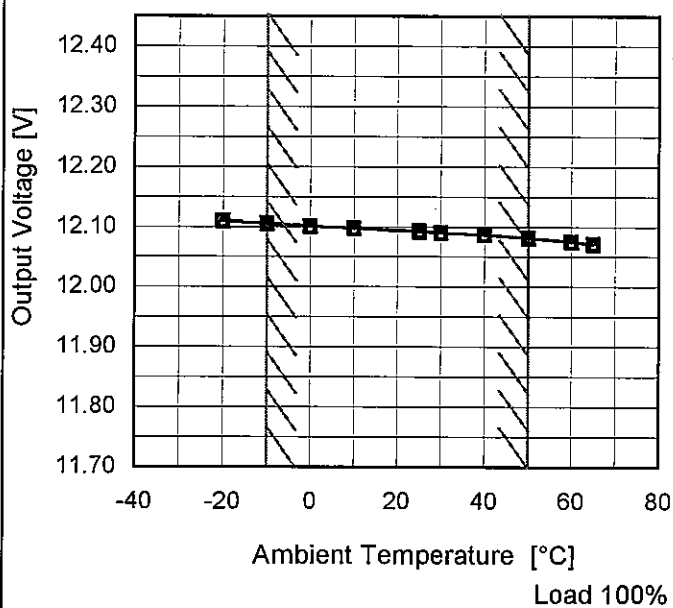
Object

+12V2.5A

Testing Circuitry Figure A

## 1. Graph

—△— Input Volt. 100V  
 ---□--- Input Volt. 200V  
 -○- - Input Volt. 230V



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	12.110	12.110	12.110
-10	12.105	12.105	12.105
0	12.101	12.101	12.101
10	12.097	12.098	12.098
25	12.093	12.093	12.093
30	12.090	12.090	12.090
40	12.087	12.087	12.087
50	12.082	12.082	12.082
60	12.075	12.075	12.075
65	12.071	12.071	12.071
--	-	-	-

		Testing Circuitry Figure A
Model	SPLFA30F-12	
Item	Output Voltage Accuracy	
Object	+12V2.5A	

### 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 : 0 - 2.5A

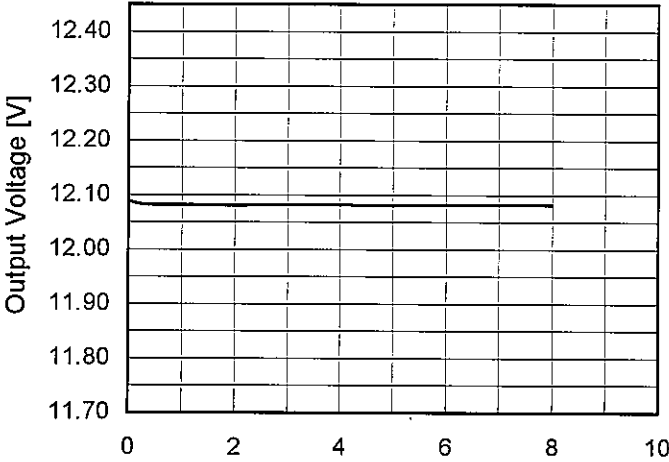
\* Output Voltage Accuracy =  $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

### 2. Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	-10	264	0	12.124	±21	±0.2
Minimum Voltage	50	85	2.5	12.082		

# COSEL

Model	SPLFA30F-12																								
Item	Time Lapse Drift	Temperature	25°C																						
Object	+12V2.5A	Testing Circuitry	Figure A																						
1.Graph		2.Values																							
<div><p>Output Voltage [V]</p><p>Time [H]</p><p>Input Volt. 100V</p><p>Load 100%</p></div>		<table><thead><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr></thead><tbody><tr><td>0.0</td><td>12.091</td></tr><tr><td>0.5</td><td>12.082</td></tr><tr><td>1.0</td><td>12.082</td></tr><tr><td>2.0</td><td>12.081</td></tr><tr><td>3.0</td><td>12.082</td></tr><tr><td>4.0</td><td>12.082</td></tr><tr><td>5.0</td><td>12.081</td></tr><tr><td>6.0</td><td>12.082</td></tr><tr><td>7.0</td><td>12.082</td></tr><tr><td>8.0</td><td>12.082</td></tr></tbody></table>		Time since start [H]	Output Voltage [V]	0.0	12.091	0.5	12.082	1.0	12.082	2.0	12.081	3.0	12.082	4.0	12.082	5.0	12.081	6.0	12.082	7.0	12.082	8.0	12.082
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* The characteristic of AC200V is equal.																									

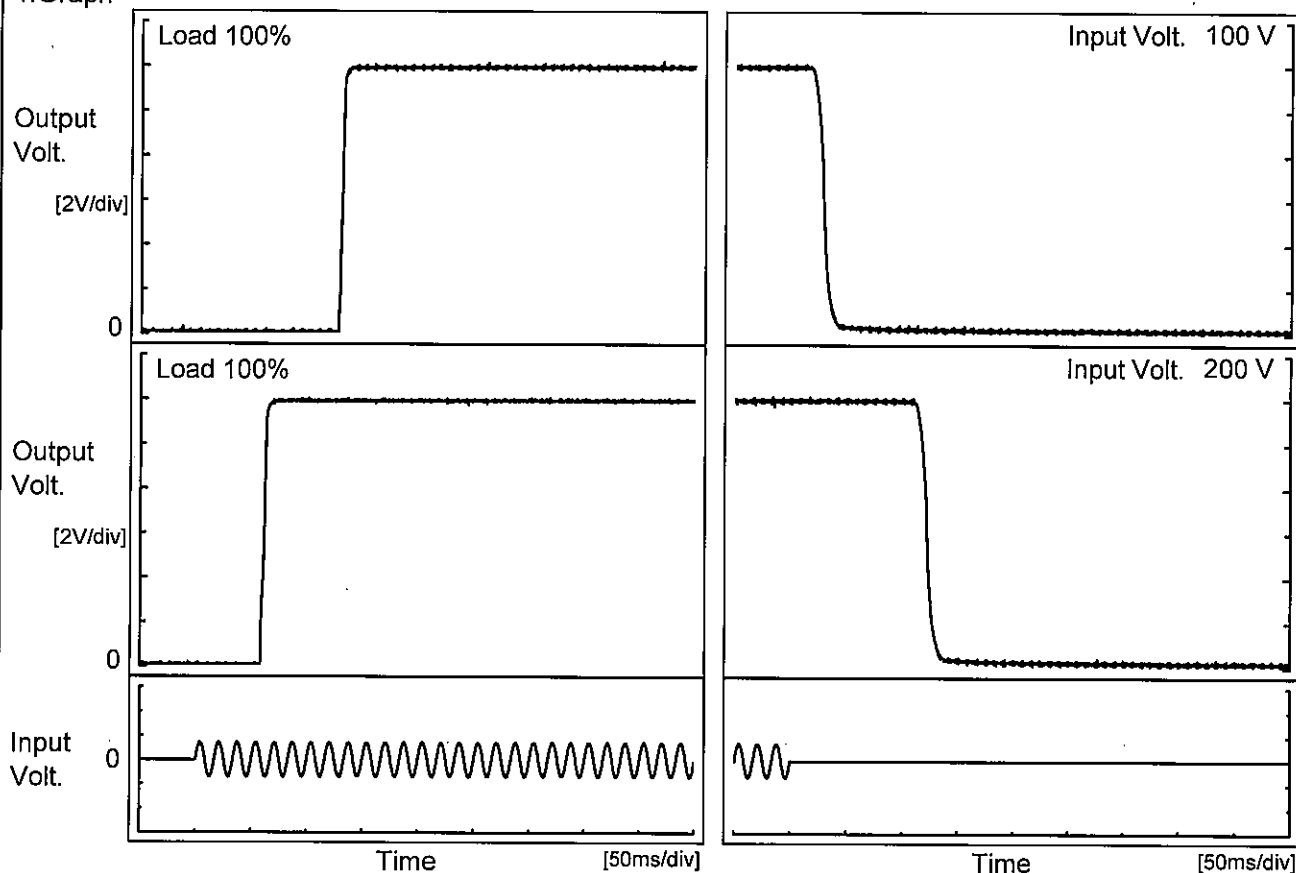
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**COSEL**

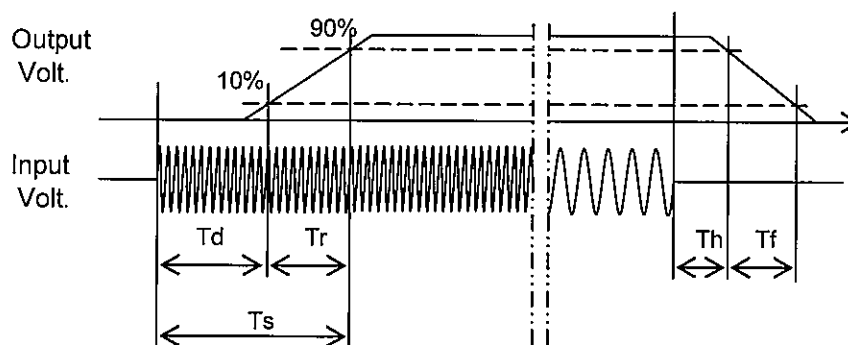
Model	LFA30F-12	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+12V2.5A		

## 1. Graph



## 2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
100 V		128.3	4.3	132.6	22.5	13.0
200 V		58.5	4.5	63.0	116.0	13.3



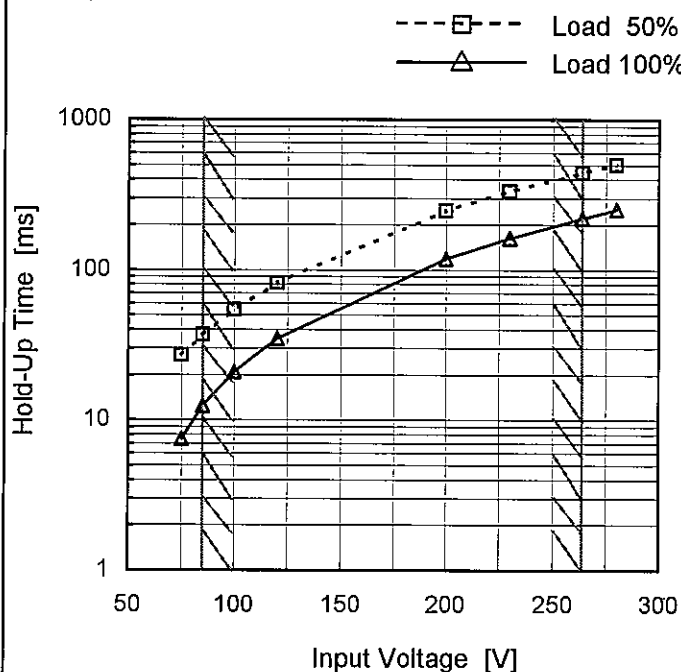
Model SPLFA30F-12

Item Hold-Up Time

Object +12V2.5A

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	27	8
85	37	12
100	54	21
120	82	35
200	249	120
230	334	163
264	445	222
280	504	253
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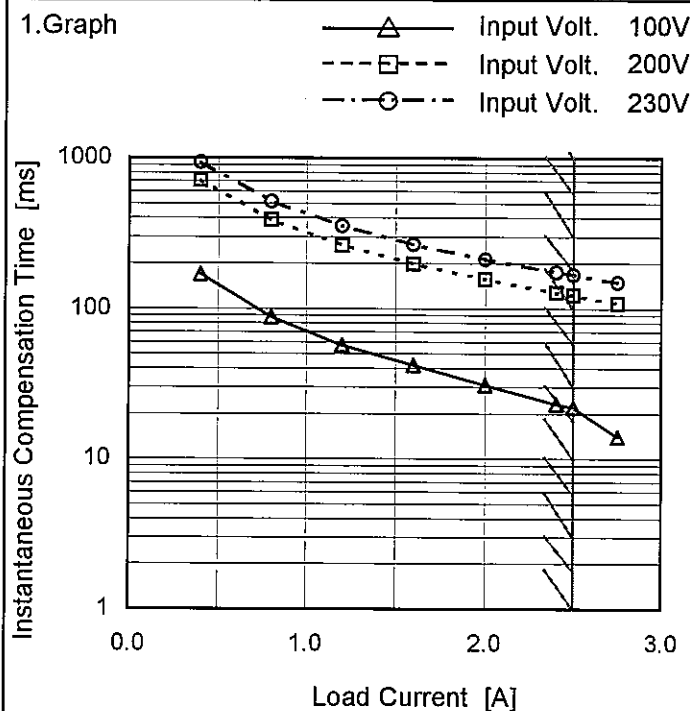
Model SPLFA30F-12

Item Instantaneous Interruption Compensation

Object +12V2.5A

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	-	-	-
0.40	170	710	937
0.80	88	385	515
1.20	57	264	354
1.60	42	198	266
2.00	31	156	213
2.40	23	128	174
2.50	22	122	167
2.75	14	108	149
--	-	-	-
--	-	-	-

Model

SPLFA30F-12

Item

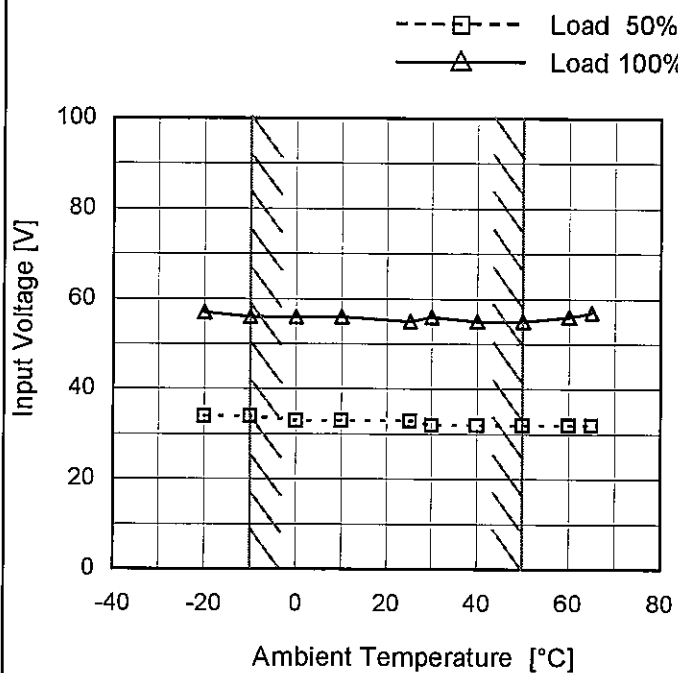
Minimum Input Voltage  
for Regulated Output Voltage

Object

+12V2.5A

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	34	57
-10	34	56
0	33	56
10	33	56
25	33	55
30	32	56
40	32	55
50	32	55
60	32	56
65	32	57
--	-	-

Model	SPLFA30F-12																																														
Item	Overcurrent Protection	Temperature	25°C																																												
Object	+12V2.5A	Testing Circuitry	Figure A																																												
1.Graph		2.Values																																													
<div><div><div></div>Input Volt. 100V</div><div><div></div>Input Volt. 200V</div></div> <p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when the output voltage is from 8V to 0V.</p>		<table><tr><th rowspan="2">Output Voltage [V]</th><th colspan="2">Load Current [A]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th></tr><tr><td>12.0</td><td>2.51</td><td>2.51</td></tr><tr><td>11.4</td><td>3.33</td><td>3.76</td></tr><tr><td>10.8</td><td>3.42</td><td>3.83</td></tr><tr><td>9.6</td><td>3.61</td><td>4.02</td></tr><tr><td>8.4</td><td>3.83</td><td>4.22</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Output Voltage [V]	Load Current [A]		Input Volt. 100[V]	Input Volt. 200[V]	12.0	2.51	2.51	11.4	3.33	3.76	10.8	3.42	3.83	9.6	3.61	4.02	8.4	3.83	4.22	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-	--	-	-
Output Voltage [V]	Load Current [A]																																														
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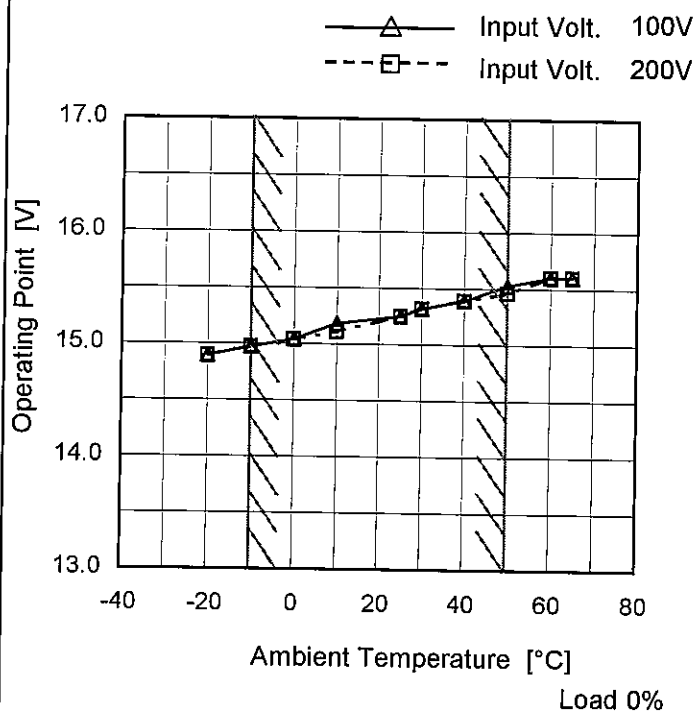
BC - 10563



Model	SPLFA30F-12
Item	Overvoltage Protection
Object	+12V2.5A

Testing Circuitry Figure A

## 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	14.89	14.89
-10	14.97	14.97
0	15.04	15.04
10	15.18	15.11
25	15.25	15.25
30	15.32	15.32
40	15.39	15.39
50	15.53	15.46
60	15.60	15.60
65	15.60	15.60
--	-	-

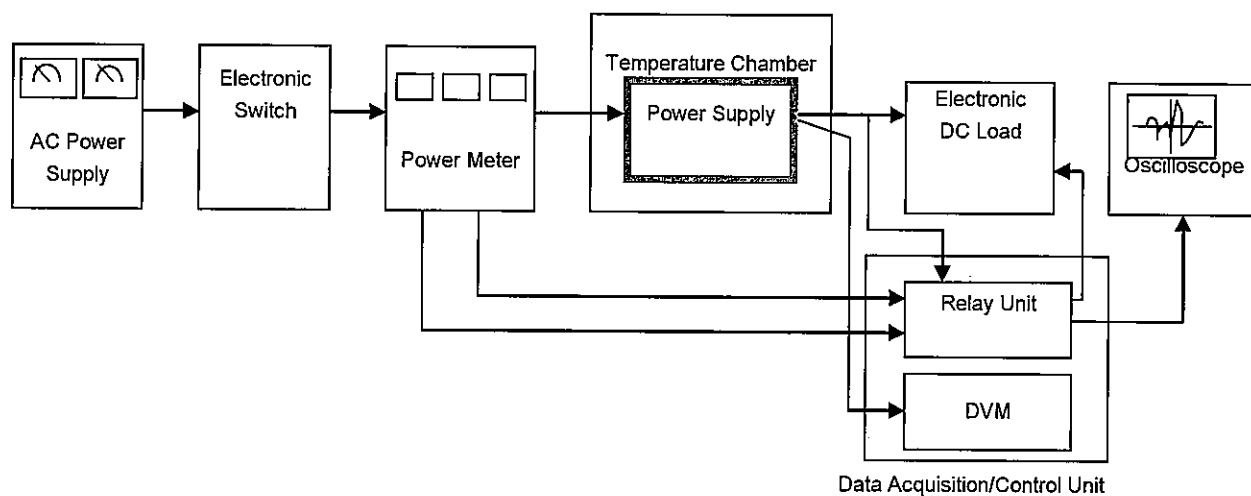


Figure A

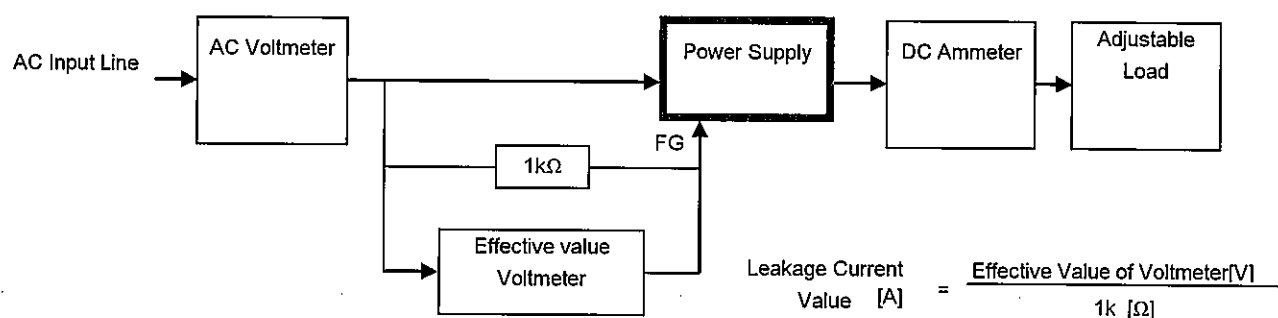


Figure B ( DEN-AN )

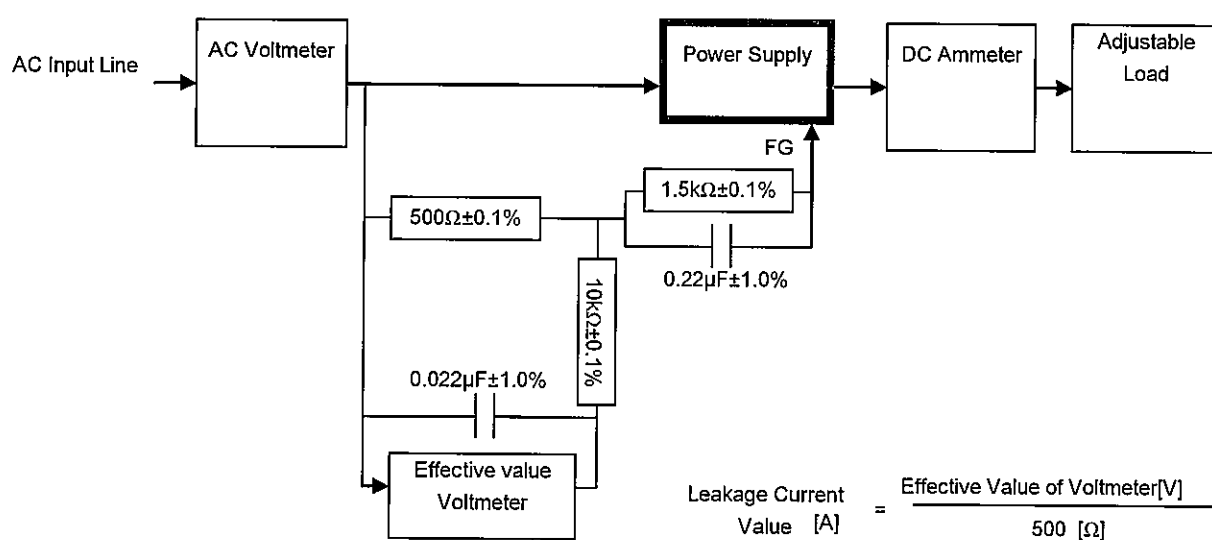


Figure B ( IEC60950-1 )