



# TEST DATA OF LFA15F-12

Regulated DC Power Supply  
June 19, 2009

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Yoshiaki Shimizu Design Manager

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Yuki Nakamura Design Engineer

**COSEL CO.,LTD.**

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- 4 -

BC-10354

Model	LFA15F-12																																
Item	Power Factor (by Input Voltage)	Temperature	25℃																														
		Testing Circuitry	Figure A																														
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BC-10354

Model	LFA15F-12																																																					
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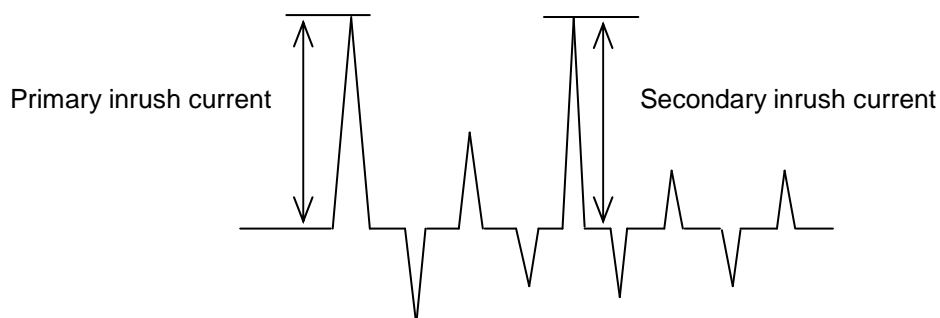
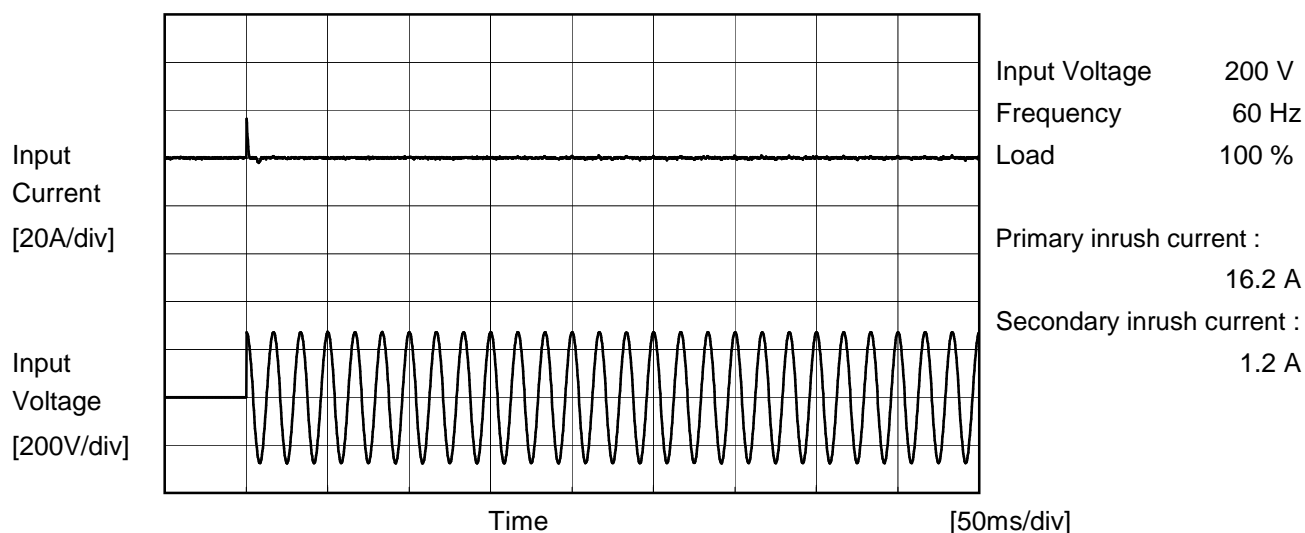
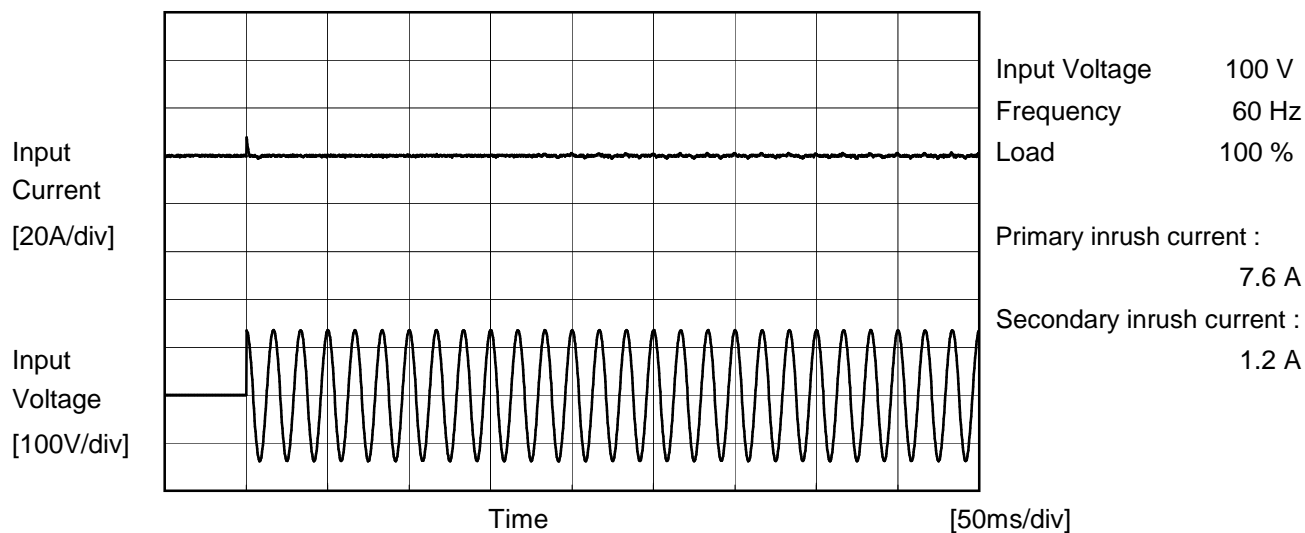
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BC-10354





Model	LFA15F-12	Temperature Testing Circuitry	25°C Figure A
Item	Inrush Current		
Object	_____		



		Temperature 25℃ Testing Circuitry Figure B
Model	LFA15F-12	
Item	Leakage Current	
Object	_____	

## 1.Results

[mA]

Standards		Input Volt.			Note
		100 [V]	200 [V]	240 [V]	
DEN-AN	Both phases	0.07	0.14	0.16	Operation
	One of phase	0.13	0.27	0.33	stand by
IEC60950-1	Both phases	0.09	0.19	0.20	Operation
	One of phase	0.13	0.28	0.31	stand by

The value for "One 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.

Model	LFA15F-12																																		
Item	Line Regulation	Temperature	25℃																																
		Testing Circuitry	Figure A																																
Object	+12V1.3A																																		
1.Graph		2.Values																																	
<div><div><div>---□---</div><div>Load 50%</div></div><div><div>—△—</div><div>Load 100%</div></div></div> <table><thead><tr><th rowspan="2">Input Voltage [V]</th><th colspan="2">Output Voltage [V]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr></thead><tbody><tr><td>75</td><td>12.121</td><td>12.116</td></tr><tr><td>85</td><td>12.121</td><td>12.116</td></tr><tr><td>100</td><td>12.121</td><td>12.117</td></tr><tr><td>120</td><td>12.121</td><td>12.117</td></tr><tr><td>200</td><td>12.121</td><td>12.117</td></tr><tr><td>230</td><td>12.121</td><td>12.117</td></tr><tr><td>264</td><td>12.121</td><td>12.117</td></tr><tr><td>280</td><td>12.122</td><td>12.117</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></tbody></table> <p>Note: Slanted line shows the range of the rated input voltage.</p>		Input Voltage [V]	Output Voltage [V]		Load 50%	Load 100%	75	12.121	12.116	85	12.121	12.116	100	12.121	12.117	120	12.121	12.117	200	12.121	12.117	230	12.121	12.117	264	12.121	12.117	280	12.122	12.117	--	-	-		
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- 10 -

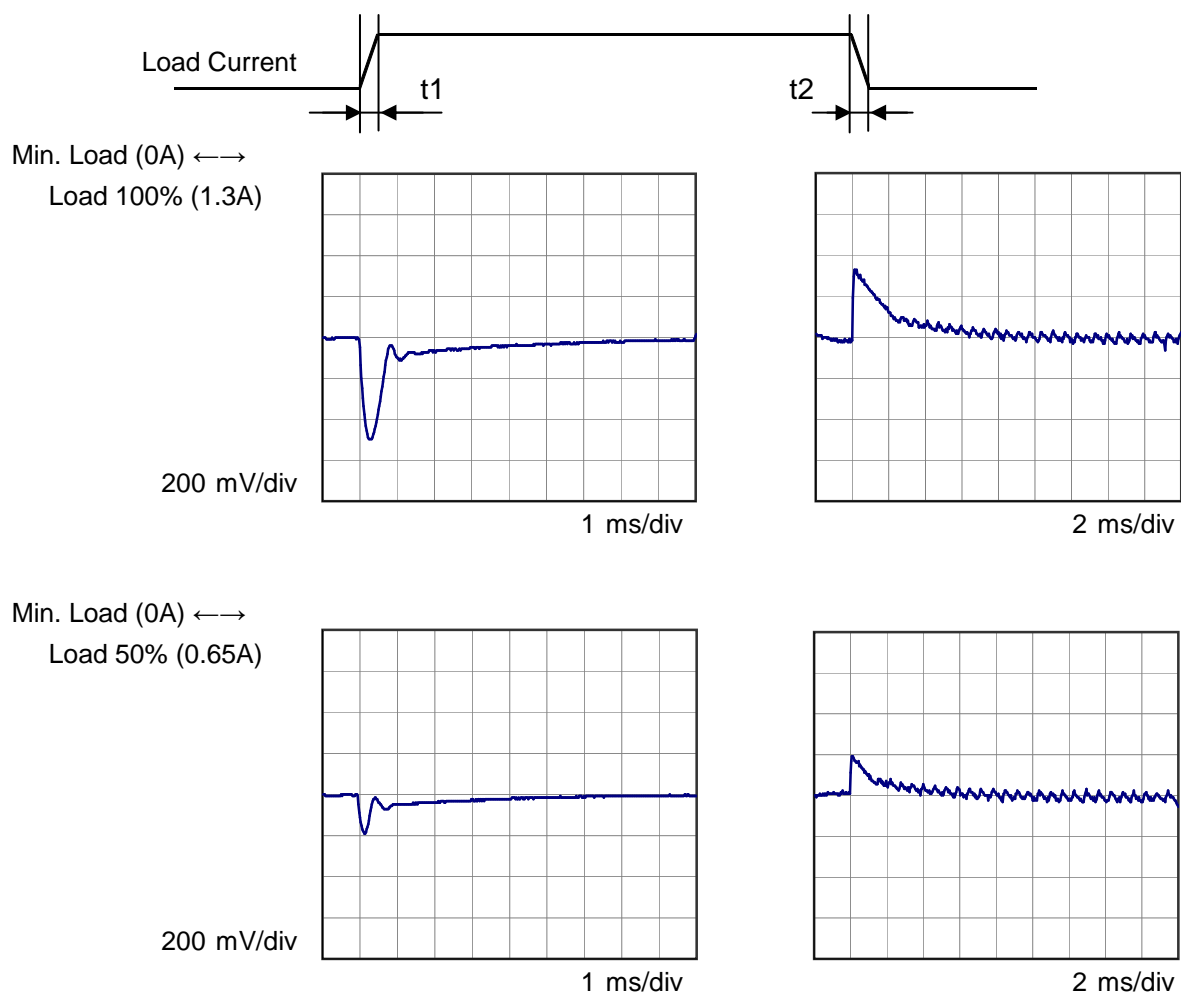
BC-10354

**COSEL**

Model	LFA15F-12	Temperature Testing Circuitry	25°C Figure A
Item	Dynamic Load Response		
Object	+12V1.3A		

Input Volt. 100 V  
Cycle 1000 ms

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

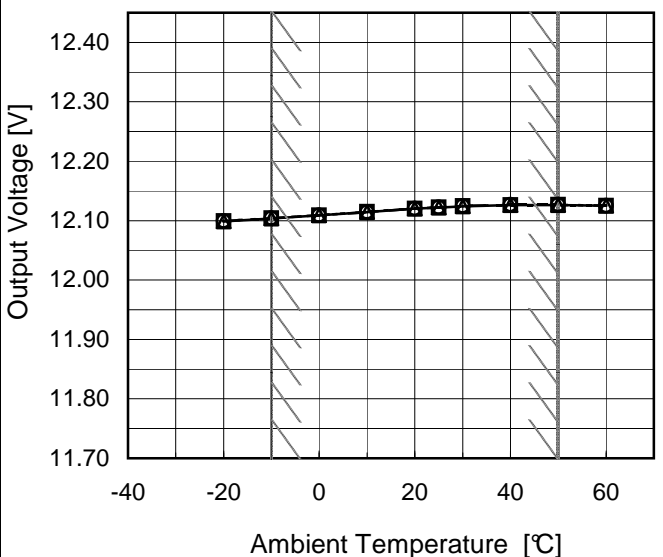


Model	LFA15F-12																																								
Item	Ripple Voltage (by Load Current)	Temperature	25℃																																						
Object	+12V1.3A	Testing Circuitry	Figure C																																						
1.Graph		2.Values																																							
<div><div><div>—△— Input Volt. 100V</div><div>-·-○-·- Input Volt. 200V</div></div><p>Ripple Voltage [mV]</p><p>Load Current [A]</p></div>		<table><tr><th rowspan="2">Load Current [A]</th><th colspan="2">Ripple Voltage [mV]</th></tr><tr><th>Input Volt. 100 [V]</th><th>Input Volt. 200 [V]</th></tr><tr><td>0.00</td><td>40</td><td>40</td></tr><tr><td>0.20</td><td>10</td><td>15</td></tr><tr><td>0.40</td><td>15</td><td>15</td></tr><tr><td>0.60</td><td>15</td><td>20</td></tr><tr><td>0.80</td><td>25</td><td>20</td></tr><tr><td>1.00</td><td>25</td><td>20</td></tr><tr><td>1.20</td><td>30</td><td>20</td></tr><tr><td>1.30</td><td>30</td><td>20</td></tr><tr><td>1.43</td><td>35</td><td>25</td></tr><tr><td>--</td><td>-</td><td>-</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Load Current [A]	Ripple Voltage [mV]		Input Volt. 100 [V]	Input Volt. 200 [V]	0.00	40	40	0.20	10	15	0.40	15	15	0.60	15	20	0.80	25	20	1.00	25	20	1.20	30	20	1.30	30	20	1.43	35	25	--	-	-	--	-	-
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Model	LFA15F-12																																								
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Model		LFA15F-12																																																				
Item		Ambient Temperature Drift																																																				
Object		+12V1.3A																																																				
1.Graph		2.Values																																																				
<div><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>Output Voltage [V]</p><p>Ambient Temperature [°C]</p><p>Load 100%</p><p>Note: Slanted line shows the range of the rated ambient temperature.</p></div>		<table><tr><th rowspan="2">Ambient Temperature [°C]</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>-20</td><td>12.099</td><td>12.099</td><td>12.099</td></tr><tr><td>-10</td><td>12.104</td><td>12.104</td><td>12.104</td></tr><tr><td>0</td><td>12.109</td><td>12.109</td><td>12.109</td></tr><tr><td>10</td><td>12.115</td><td>12.115</td><td>12.115</td></tr><tr><td>20</td><td>12.120</td><td>12.120</td><td>12.120</td></tr><tr><td>25</td><td>12.122</td><td>12.122</td><td>12.122</td></tr><tr><td>30</td><td>12.124</td><td>12.124</td><td>12.124</td></tr><tr><td>40</td><td>12.126</td><td>12.126</td><td>12.127</td></tr><tr><td>50</td><td>12.126</td><td>12.127</td><td>12.127</td></tr><tr><td>60</td><td>12.125</td><td>12.125</td><td>12.125</td></tr><tr><td>--</td><td>-</td><td>-</td><td>-</td></tr></table>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	-20	12.099	12.099	12.099	-10	12.104	12.104	12.104	0	12.109	12.109	12.109	10	12.115	12.115	12.115	20	12.120	12.120	12.120	25	12.122	12.122	12.122	30	12.124	12.124	12.124	40	12.126	12.126	12.127	50	12.126	12.127	12.127	60	12.125	12.125	12.125	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																					
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																			
-20	12.099	12.099	12.099																																																			
-10	12.104	12.104	12.104																																																			
0	12.109	12.109	12.109																																																			
10	12.115	12.115	12.115																																																			
20	12.120	12.120	12.120																																																			
25	12.122	12.122	12.122																																																			
30	12.124	12.124	12.124																																																			
40	12.126	12.126	12.127																																																			
50	12.126	12.127	12.127																																																			
60	12.125	12.125	12.125																																																			
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		Testing Circuitry Figure A
Model	LFA15F-12	
Item	Output Voltage Accuracy	
Object	+12V1.3A	

### 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℃

Input Voltage : 85 - 264V

Load Current : 0 - 1.3A

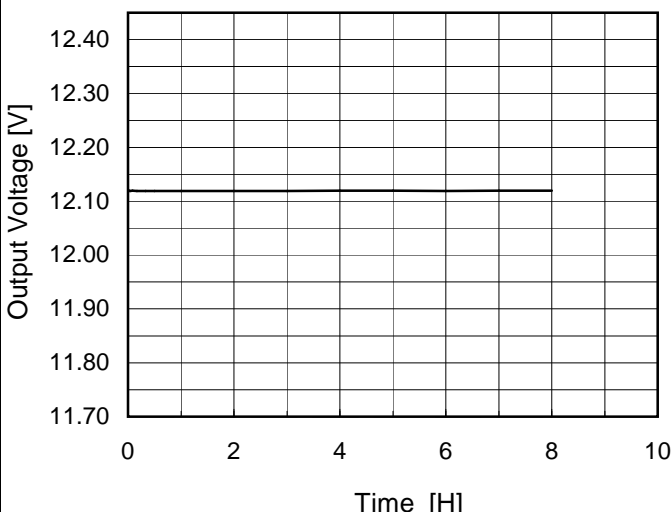
\* Output Voltage Accuracy =  $\pm(\text{Maximum of Output Voltage} - \text{Minimum of Output Voltage}) / 2$

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

### 2. Values

Item	Temperature [℃]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	50	264	0	12.135	±14	±0.1
Minimum Voltage	-10	85	1.3	12.108		



Model	LFA15F-12																								
Item	Time Lapse Drift	Temperature	25℃																						
		Testing Circuitry	Figure A																						
Object	+12V1.3A																								
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><tr><th>Time since start [H]</th><th>Output Voltage [V]</th></tr><tr><td>0.0</td><td>12.119</td></tr><tr><td>0.5</td><td>12.119</td></tr><tr><td>1.0</td><td>12.119</td></tr><tr><td>2.0</td><td>12.119</td></tr><tr><td>3.0</td><td>12.119</td></tr><tr><td>4.0</td><td>12.119</td></tr><tr><td>5.0</td><td>12.119</td></tr><tr><td>6.0</td><td>12.119</td></tr><tr><td>7.0</td><td>12.119</td></tr><tr><td>8.0</td><td>12.120</td></tr></table>		Time since start [H]	Output Voltage [V]	0.0	12.119	0.5	12.119	1.0	12.119	2.0	12.119	3.0	12.119	4.0	12.119	5.0	12.119	6.0	12.119	7.0	12.119	8.0	12.120
Time since start [H]	Output Voltage [V]																								
0.0	12.119																								
0.5	12.119																								
1.0	12.119																								
2.0	12.119																								
3.0	12.119																								
4.0	12.119																								
5.0	12.119																								
6.0	12.119																								
7.0	12.119																								
8.0	12.120																								
* The characteristic of AC200V is equal.																									

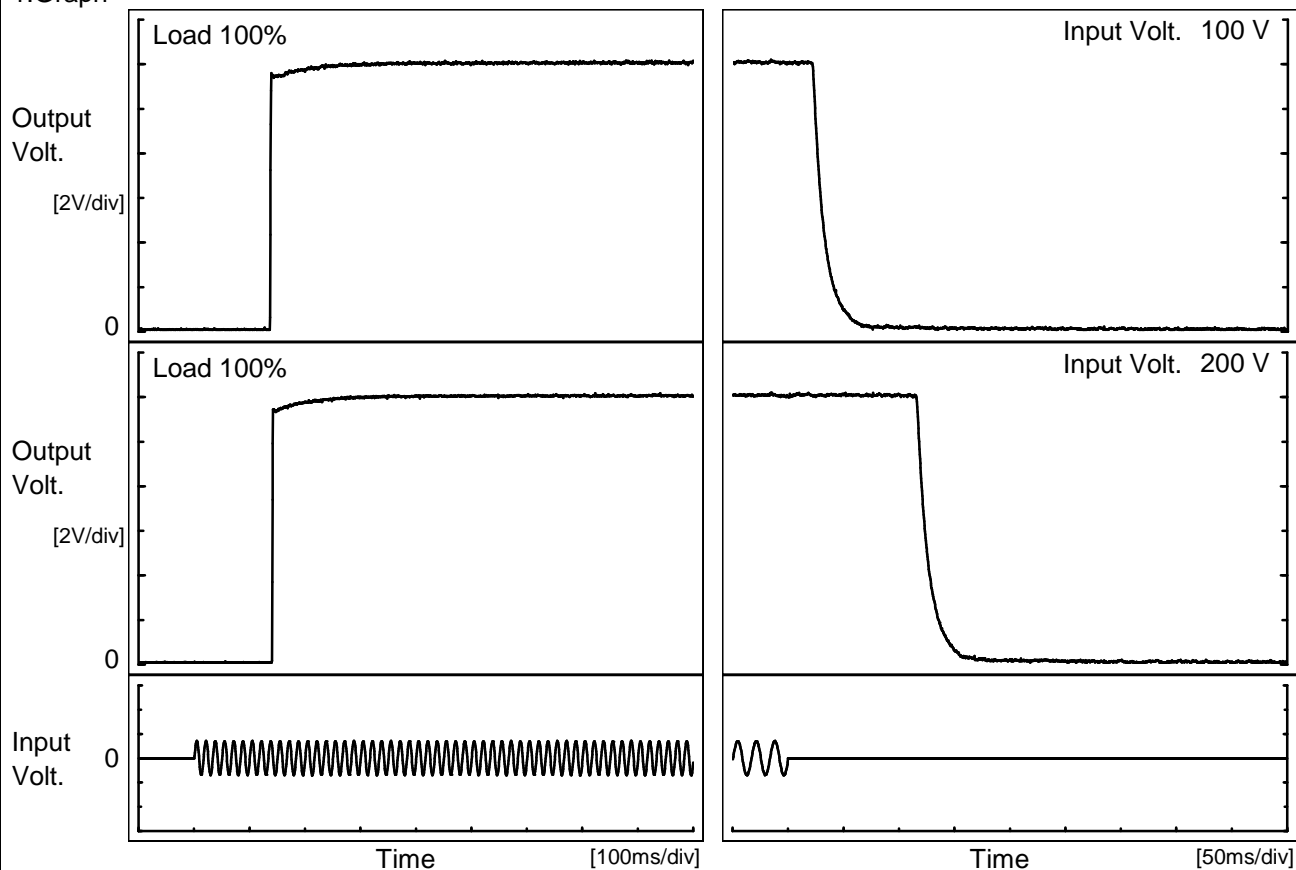
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# COSEL

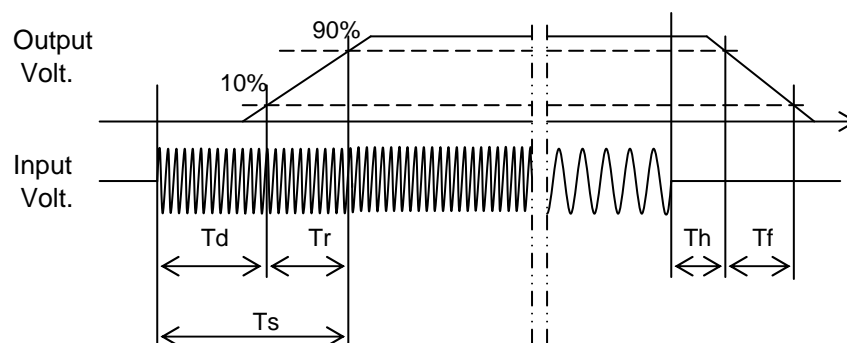
Model	LFA15F-12	Temperature	25°C
Item	Rise and Fall Time	Testing Circuitry	Figure A
Object	+12V1.3A		

## 1. Graph



## 2. Values

Input Volt. \ Time	Td	Tr	Ts	Th	Tf
100 V	137.5	2.0	139.5	22.8	23.0
200 V	141.0	1.5	142.5	117.0	24.8



Model	LFA15F-12																																		
Item	Hold-Up Time	Temperature	25℃																																
		Testing Circuitry	Figure A																																
Object	+12V1.3A																																		
1.Graph		2.Values																																	
<div><div><div>---□--- Load 50%</div><div>—△— Load 100%</div></div><div>Hold-Up Time [ms]</div><div>Input Voltage [V]</div></div>		<table><tr><th rowspan="2">Input Voltage [V]</th><th colspan="2">Hold-Up Time [ms]</th></tr><tr><th>Load 50%</th><th>Load 100%</th></tr><tr><td>75</td><td>22</td><td>6</td></tr><tr><td>85</td><td>31</td><td>10</td></tr><tr><td>100</td><td>48</td><td>20</td></tr><tr><td>120</td><td>74</td><td>29</td></tr><tr><td>200</td><td>233</td><td>112</td></tr><tr><td>230</td><td>313</td><td>154</td></tr><tr><td>264</td><td>419</td><td>211</td></tr><tr><td>280</td><td>475</td><td>241</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Input Voltage [V]	Hold-Up Time [ms]		Load 50%	Load 100%	75	22	6	85	31	10	100	48	20	120	74	29	200	233	112	230	313	154	264	419	211	280	475	241	--	-	-
Input Voltage [V]	Hold-Up Time [ms]																																		
	Load 50%	Load 100%																																	
75	22	6																																	
85	31	10																																	
100	48	20																																	
120	74	29																																	
200	233	112																																	
230	313	154																																	
264	419	211																																	
280	475	241																																	
--	-	-																																	
<p>This duration covers from Shut-off of input voltage to the moment when output voltage descends to the rated range of voltage accuracy.</p> <p>Note: Slanted line shows the range of the rated input voltage.</p>																																			

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Model	LFA15F-12																																																					
Item	Instantaneous Interruption Compensation	Temperature	25℃																																																			
Object	+12V1.3A	Testing Circuitry	Figure A																																																			
1.Graph		2.Values																																																				
<div><div>—△—</div>Input Volt. 100V</div> <div><div>---□---</div>Input Volt. 200V</div> <div><div>---○---</div>Input Volt. 230V</div> <p>Instantaneous Compensation Time [ms]</p> <p>Load Current [A]</p> <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">Time [ms]</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>0.20</td><td>153</td><td>682</td><td>910</td></tr><tr><td>0.40</td><td>81</td><td>375</td><td>501</td></tr><tr><td>0.60</td><td>54</td><td>255</td><td>342</td></tr><tr><td>0.80</td><td>35</td><td>192</td><td>258</td></tr><tr><td>1.00</td><td>25</td><td>148</td><td>203</td></tr><tr><td>1.20</td><td>21</td><td>122</td><td>168</td></tr><tr><td>1.30</td><td>20</td><td>112</td><td>154</td></tr><tr><td>1.43</td><td>16</td><td>101</td><td>138</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]	Time [ms]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.00	-	-	-	0.20	153	682	910	0.40	81	375	501	0.60	54	255	342	0.80	35	192	258	1.00	25	148	203	1.20	21	122	168	1.30	20	112	154	1.43	16	101	138	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																					
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]																																																			
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Model

LFA15F-12

Item

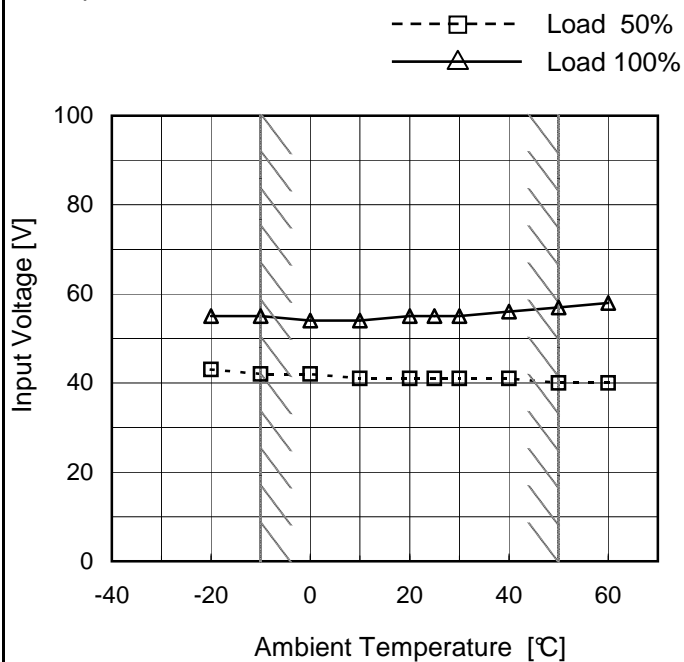
Minimum Input Voltage  
for Regulated Output Voltage

Object

+12V1.3A

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	43	55
-10	42	55
0	42	54
10	41	54
20	41	55
25	41	55
30	41	55
40	41	56
50	40	57
60	40	58
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Model	LFA15F-12																																											
Item	Overcurrent Protection	Temperature	25℃																																									
		Testing Circuitry	Figure A																																									
Object	+12V1.3A																																											
1.Graph		2.Values																																										
<div><div><div>△</div><div>Input Volt. 100V</div></div><div><div>○</div><div>Input Volt. 200V</div></div></div> <p>Note: Slanted line shows the range of the rated load current.</p> <p>Intermittent operation occurs when the output voltage is less than rated output voltage.</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>2.19</td><td>2.84</td></tr><tr><td>11.4</td><td>-</td><td>-</td></tr><tr><td>10.8</td><td>-</td><td>-</td></tr><tr><td>9.6</td><td>-</td><td>-</td></tr><tr><td>8.4</td><td>-</td><td>-</td></tr><tr><td>7.2</td><td>-</td><td>-</td></tr><tr><td>6.0</td><td>-</td><td>-</td></tr><tr><td>4.8</td><td>-</td><td>-</td></tr><tr><td>3.6</td><td>-</td><td>-</td></tr><tr><td>2.4</td><td>-</td><td>-</td></tr><tr><td>1.2</td><td>-</td><td>-</td></tr><tr><td>0.0</td><td>-</td><td>-</td></tr></table>		Output Voltage [V]	Load Current [A]		Input Volt. 100[V]	Input Volt. 200[V]	12.0	2.19	2.84	11.4	-	-	10.8	-	-	9.6	-	-	8.4	-	-	7.2	-	-	6.0	-	-	4.8	-	-	3.6	-	-	2.4	-	-	1.2	-	-	0.0	-	-
Output Voltage [V]	Load Current [A]																																											
	Input Volt. 100[V]	Input Volt. 200[V]																																										
12.0	2.19	2.84																																										
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6.0	-	-																																										
4.8	-	-																																										
3.6	-	-																																										
2.4	-	-																																										
1.2	-	-																																										
0.0	-	-																																										

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Model	LFA15F-12																																								
Item	Overvoltage Protection	Testing Circuitry    Figure A																																							
Object	+12V1.3A																																								
1.Graph		2.Values																																							
<div><div><div>—△—</div><div>Input Volt.    100V</div></div><div><div>---□---</div><div>Input Volt.    200V</div></div></div> <p>Operating Point [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 0%</p> <p>Note: Slanted line shows the range of the rated ambient temperature.</p>		<table><tr><th rowspan="2">Ambient Temperature [°C]</th><th colspan="2">Operating Point [V]</th></tr><tr><th>Input Volt. 100[V]</th><th>Input Volt. 200[V]</th></tr><tr><td>-20</td><td>14.85</td><td>14.85</td></tr><tr><td>-10</td><td>14.99</td><td>14.99</td></tr><tr><td>0</td><td>15.06</td><td>15.06</td></tr><tr><td>10</td><td>15.14</td><td>15.14</td></tr><tr><td>20</td><td>15.21</td><td>15.21</td></tr><tr><td>25</td><td>15.28</td><td>15.28</td></tr><tr><td>30</td><td>15.27</td><td>15.27</td></tr><tr><td>40</td><td>15.41</td><td>15.41</td></tr><tr><td>50</td><td>15.48</td><td>15.48</td></tr><tr><td>60</td><td>15.55</td><td>15.55</td></tr><tr><td>--</td><td>-</td><td>-</td></tr></table>		Ambient Temperature [°C]	Operating Point [V]		Input Volt. 100[V]	Input Volt. 200[V]	-20	14.85	14.85	-10	14.99	14.99	0	15.06	15.06	10	15.14	15.14	20	15.21	15.21	25	15.28	15.28	30	15.27	15.27	40	15.41	15.41	50	15.48	15.48	60	15.55	15.55	--	-	-
Ambient Temperature [°C]	Operating Point [V]																																								
	Input Volt. 100[V]	Input Volt. 200[V]																																							
-20	14.85	14.85																																							
-10	14.99	14.99																																							
0	15.06	15.06																																							
10	15.14	15.14																																							
20	15.21	15.21																																							
25	15.28	15.28																																							
30	15.27	15.27																																							
40	15.41	15.41																																							
50	15.48	15.48																																							
60	15.55	15.55																																							
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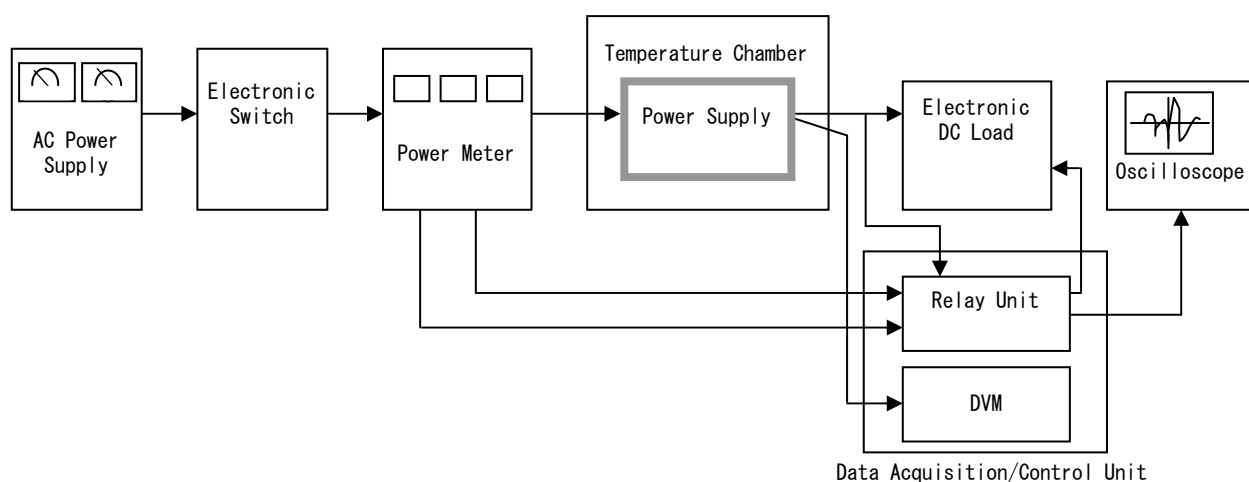


Figure A

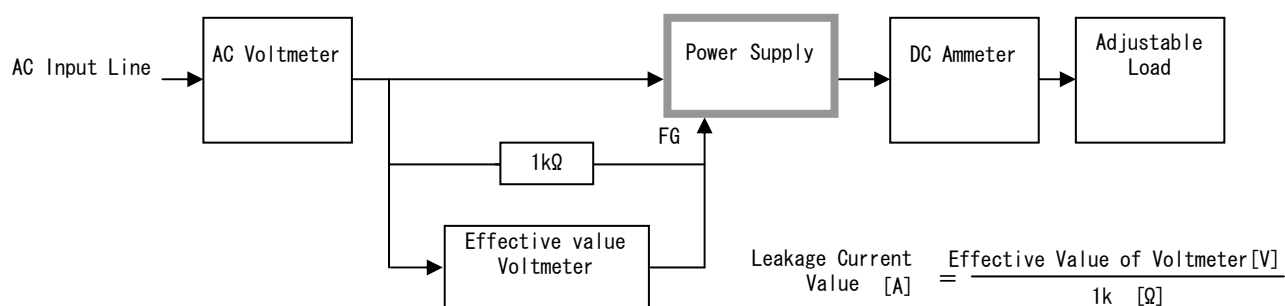


Figure B ( DEN-AN )

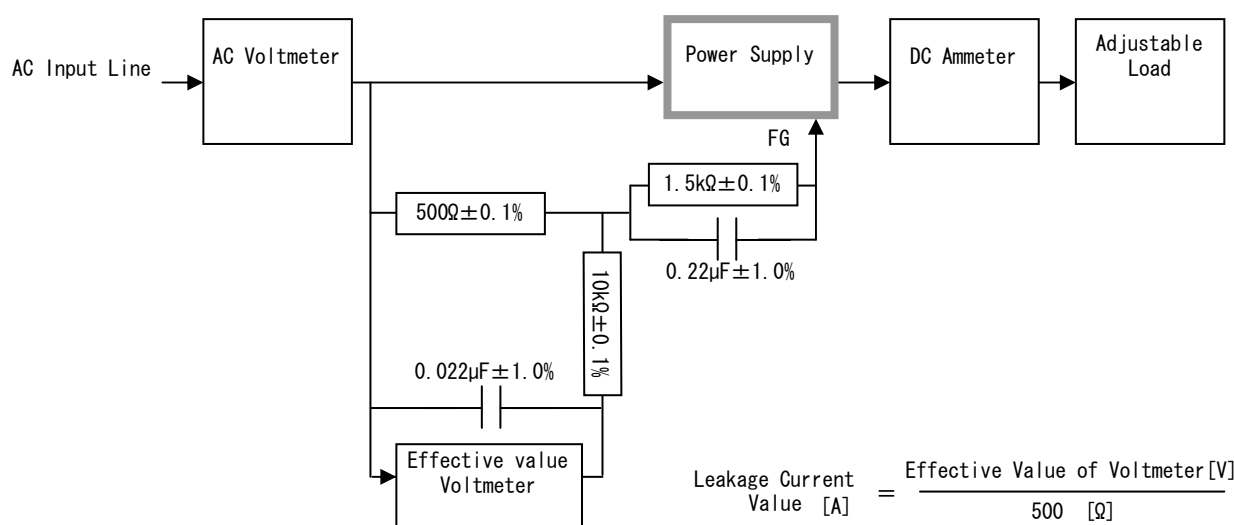


Figure B ( IEC60950-1 )

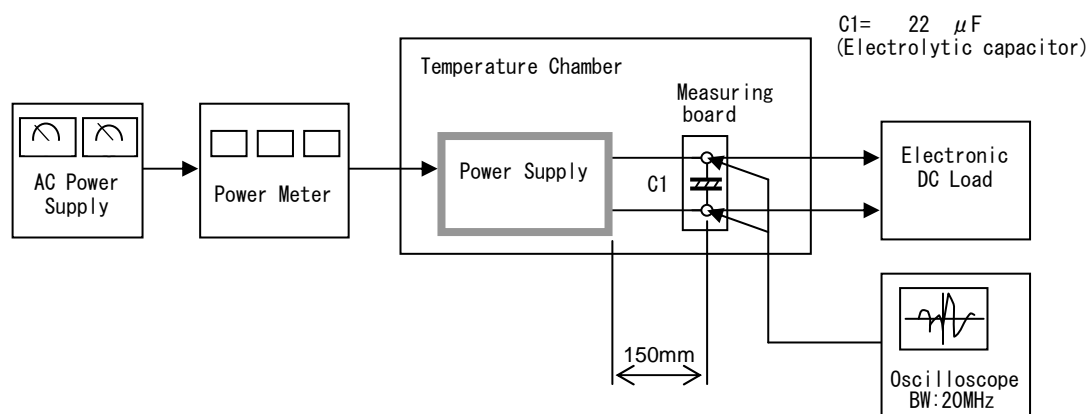


Figure C