

TEST DATA OF TUNS100F05

Regulated DC Power Supply
April 9, 2012

Approved by : Takayuki Fukuda
Takayuki Fukuda Design Manager

Prepared by : Daisuke Tsuchida
Daisuke Tsuchida Design Engineer

COSEL CO.,LTD.

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<p>Model TUNS100F05</p>		<p>Temperature 25°C Testing Circuitry Figure A</p>																																																			
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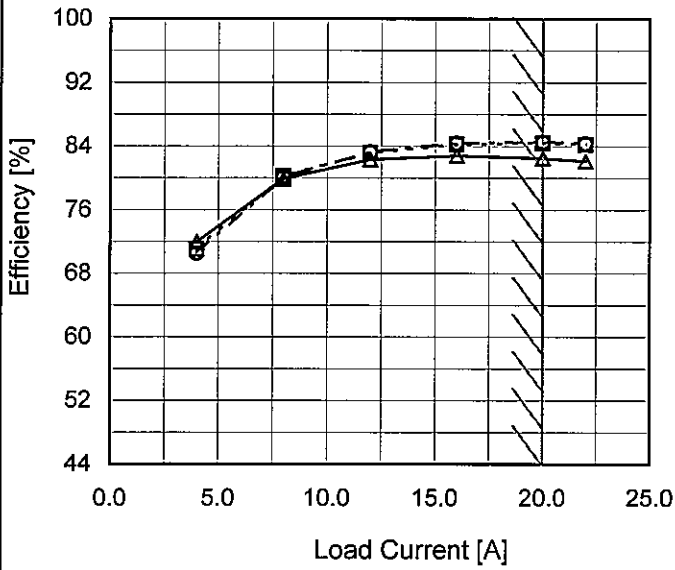


Model	TUNS100F05
Item	Efficiency (by Load Current)
Object	

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]	Efficiency [%]		
	Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]
0.0	-	-	-
4.0	72.0	71.0	70.5
8.0	79.9	80.2	80.1
12.0	82.3	83.1	83.2
16.0	82.8	84.2	84.4
20.0	82.5	84.4	84.5
22.0	82.1	84.2	84.4
--	-	-	-
--	-	-	-
--	-	-	-
--	-	-	-



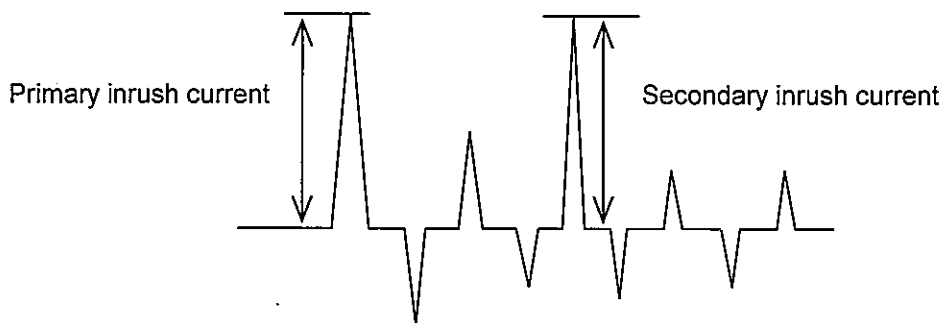
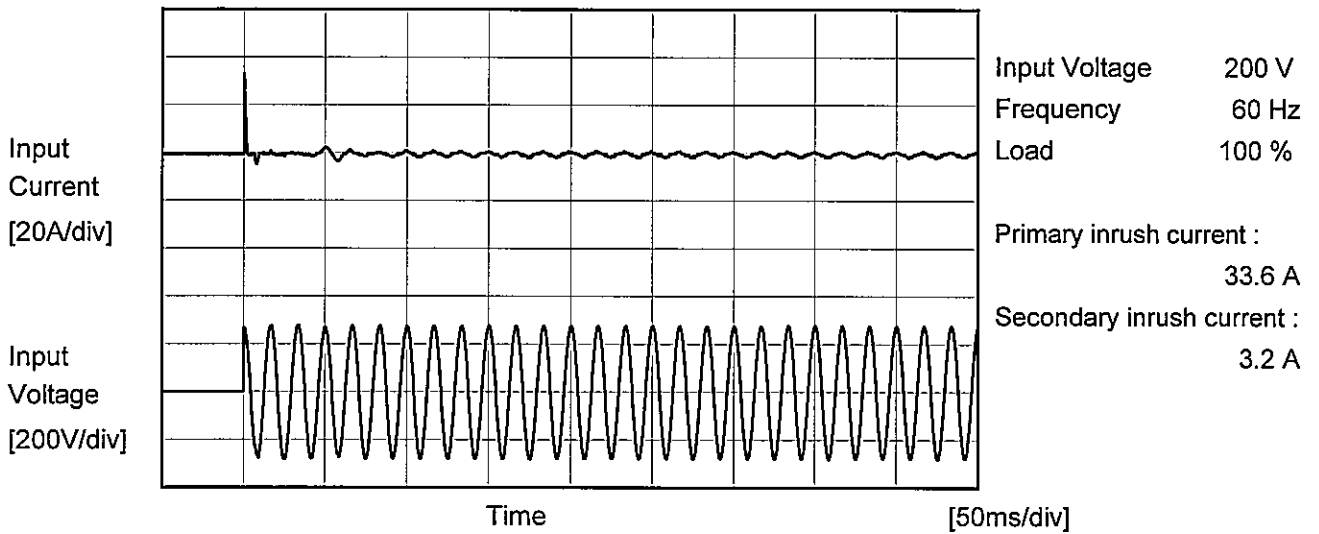
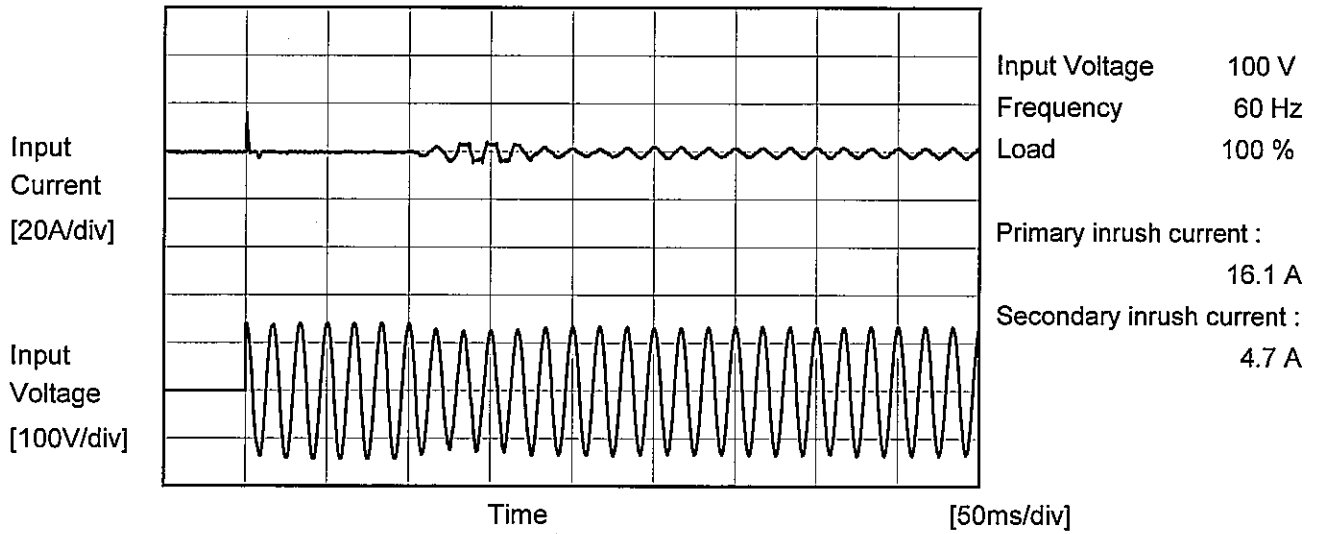
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Model		TUNS100F05	Temperature 25°C Testing Circuitry Figure A
Item		Inrush Current	
Object		_____	





COSEL		Temperature 25°C Testing Circuitry Figure B
Model	TUNS100F05	
Item	Leakage Current	
Object	_____	

1.Results

Standards		Input Volt.			Note
		100 [V]	200 [V]	264[V]	
IEC60950-1	Both phases	0.17	0.37	0.49	Operation
	One of phase	0.22	0.48	0.65	stand by

[mA]

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.



COSEL																																			
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Item	Line Regulation	Testing Circuitry	Figure A																																
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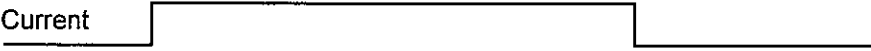


<p>Model TUNS100F05</p> <p>Item Load Regulation</p> <p>Object +5V20A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure A</p>																																																			
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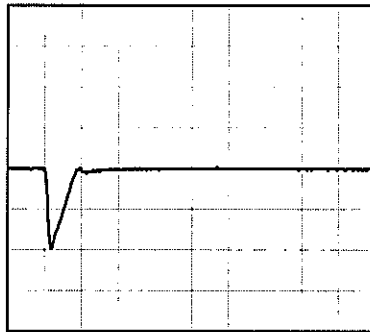
Model		TUNS100F05	Temperature		25°C
Item		Dynamic Load Response	Testing Circuitry		Figure A
Object		+5V20A			

Input Volt. 100 V
Cycle 1000 ms

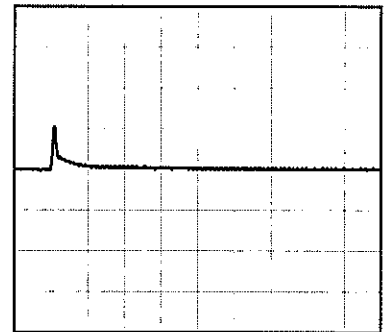
Load Current  20 A/50us

Min. Load (0A) ←→
Load 100% (20A)

200 mV/div



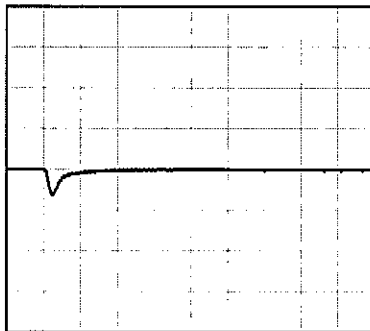
200 μs/div



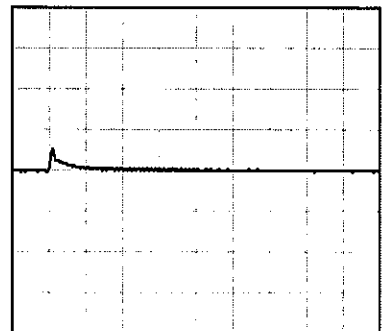
200 μs/div

Min. Load (0A) ←→
Load 50% (10A)

200 mV/div



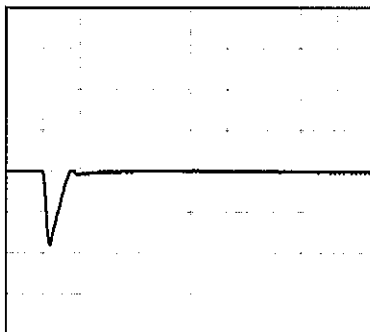
200 μs/div



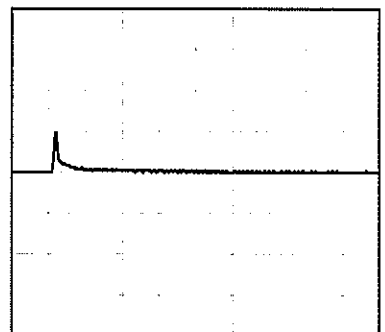
200 μs/div

Load 10% (2A) ←→
Load 100% (20A)

200 mV/div



200 μs/div



200 μs/div



<p>Model TUNS100F05</p> <p>Item Ripple Voltage (by Load Current)</p> <p>Object +5V20A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure C</p>																																						
<p>1. Graph</p> <div style="text-align: right;"> <p>—△— Input Volt. 100V</p> <p>- -○- - Input Volt. 200V</p> </div> <p>Measured by 100 MHz Oscilloscope. Ripple Voltage is shown as p-p in the figure below. Note: Slanted line shows the range of the rated load current.</p>		<p>2. Values</p> <table border="1"> <thead> <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> </thead> <tbody> <tr><td>0.0</td><td>25</td><td>25</td></tr> <tr><td>4.0</td><td>30</td><td>30</td></tr> <tr><td>8.0</td><td>30</td><td>30</td></tr> <tr><td>12.0</td><td>30</td><td>30</td></tr> <tr><td>16.0</td><td>30</td><td>30</td></tr> <tr><td>20.0</td><td>30</td><td>30</td></tr> <tr><td>22.0</td><td>30</td><td>30</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> </tbody> </table>	Load Current [A]	Ripple Voltage [mV]		Input Volt. 100 [V]	Input Volt. 200 [V]	0.0	25	25	4.0	30	30	8.0	30	30	12.0	30	30	16.0	30	30	20.0	30	30	22.0	30	30	--	-	-	--	-	-	--	-	-	--	-	-
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<p>Fig. Complex Ripple Wave Form</p>																																								



<p>Model TUNS100F05</p> <p>Item Ripple-Noise</p> <p>Object +5V20A</p>		<p>Temperature 25°C</p> <p>Testing Circuitry Figure C</p>																																						
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Model		TUNS100F05	Testing Circuitry Figure C																																						
Item		Ripple Voltage (by Ambient Temp.)																																							
Object		+5V20A																																							
1. Graph		<p> ---□--- Input Volt. 100V —△— Input Volt. 200V </p> <p style="text-align: center;">Ambient Temperature [°C] Load 100 %</p>	2. Values																																						
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Ambient Temperature [°C]	Ripple Voltage [mV]																																								
	Input Volt. 100 [V]	Input Volt. 200 [V]																																							
-50	70	80																																							
-40	65	75																																							
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Model		TUNS100F05	Testing Circuitry Figure A																																																				
Item		Ambient Temperature Drift																																																					
Object		+5V20A																																																					
1.Graph			2.Values																																																				
<p> —△— Input Volt. 100V ---□--- Input Volt. 200V -·-○-·- Input Volt. 230V </p> <p>Output Voltage [V]</p> <p>Ambient Temperature [°C]</p> <p>Load 100%</p>			<table border="1"> <thead> <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> </thead> <tbody> <tr><td>-50</td><td>5.031</td><td>5.031</td><td>5.031</td></tr> <tr><td>-40</td><td>5.032</td><td>5.032</td><td>5.032</td></tr> <tr><td>-20</td><td>5.032</td><td>5.032</td><td>5.032</td></tr> <tr><td>0</td><td>5.034</td><td>5.034</td><td>5.034</td></tr> <tr><td>25</td><td>5.041</td><td>5.042</td><td>5.042</td></tr> <tr><td>50</td><td>5.047</td><td>5.047</td><td>5.048</td></tr> <tr><td>75</td><td>5.051</td><td>5.051</td><td>5.051</td></tr> <tr><td>85</td><td>5.052</td><td>5.052</td><td>5.052</td></tr> <tr><td>100</td><td>5.053</td><td>5.053</td><td>5.053</td></tr> <tr><td>105</td><td>5.053</td><td>5.053</td><td>5.053</td></tr> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>		Ambient Temperature [°C]	Output Voltage [V]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	-50	5.031	5.031	5.031	-40	5.032	5.032	5.032	-20	5.032	5.032	5.032	0	5.034	5.034	5.034	25	5.041	5.042	5.042	50	5.047	5.047	5.048	75	5.051	5.051	5.051	85	5.052	5.052	5.052	100	5.053	5.053	5.053	105	5.053	5.053	5.053	--	-	-	-
Ambient Temperature [°C]	Output Voltage [V]																																																						
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<p>Note: Slanted line shows the range of the rated ambient temperature.</p>																																																							



COSEL		
Model	TUNS100F05	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+5V20A	

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 : -40 - 100°C

Input Voltage : 85 - 264V

Load Current : 0 - 20A

* 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 [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	100	264	0	5.056	±13	±0.3
Minimum Voltage	-40	85	20	5.031		

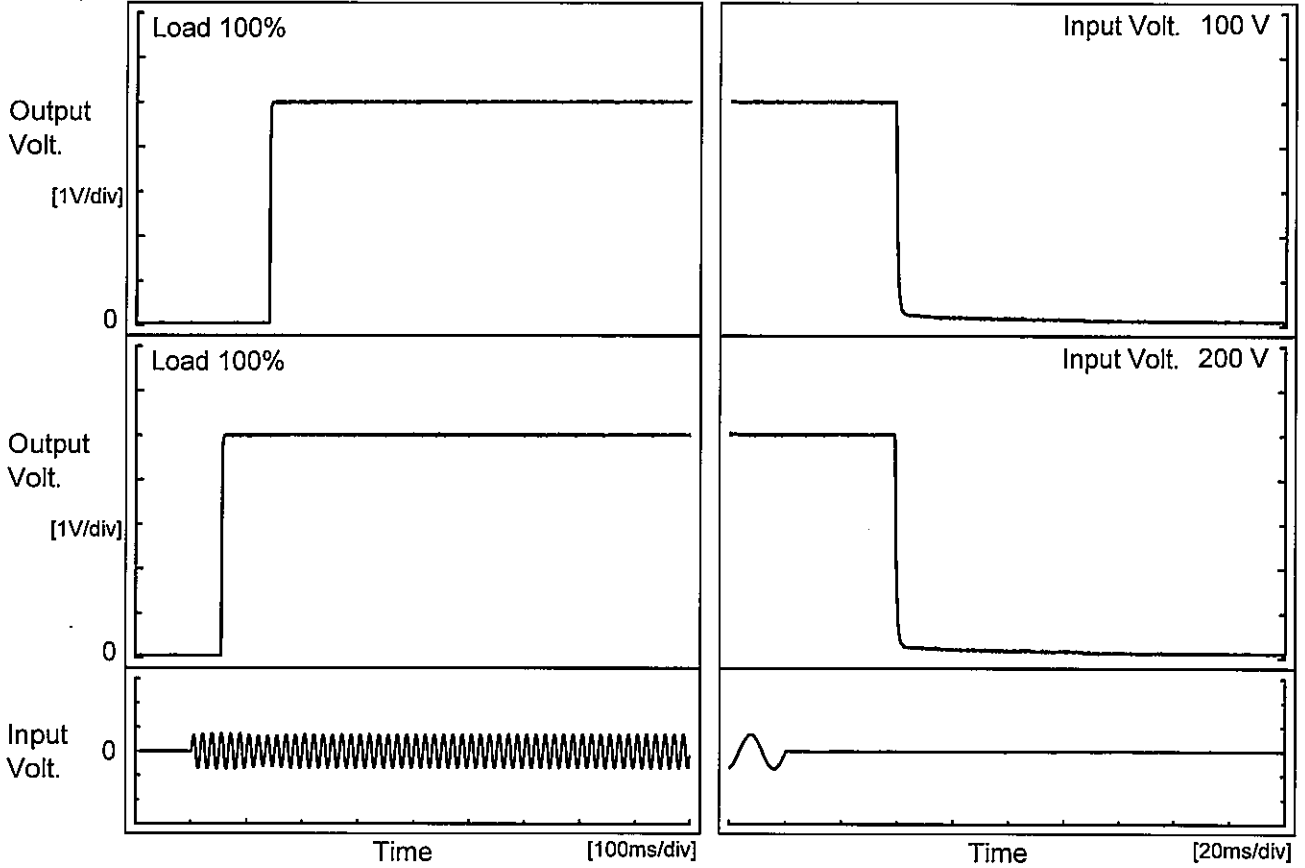


COSEL																								
Model	TUNS100F05																							
Item	Time Lapse Drift	Temperature 25°C Testing Circuitry Figure A																						
Object	+5V20A																							
<p>1.Graph</p> <p style="text-align: center;">Time [H]</p> <p>Input Volt. 100V Load 100%</p>		<p>2.Values</p> <table border="1"> <thead> <tr> <th>Time since start [H]</th> <th>Output Voltage [V]</th> </tr> </thead> <tbody> <tr><td>0.0</td><td>5.037</td></tr> <tr><td>0.5</td><td>5.040</td></tr> <tr><td>1.0</td><td>5.040</td></tr> <tr><td>2.0</td><td>5.040</td></tr> <tr><td>3.0</td><td>5.040</td></tr> <tr><td>4.0</td><td>5.040</td></tr> <tr><td>5.0</td><td>5.040</td></tr> <tr><td>6.0</td><td>5.040</td></tr> <tr><td>7.0</td><td>5.040</td></tr> <tr><td>8.0</td><td>5.040</td></tr> </tbody> </table>	Time since start [H]	Output Voltage [V]	0.0	5.037	0.5	5.040	1.0	5.040	2.0	5.040	3.0	5.040	4.0	5.040	5.0	5.040	6.0	5.040	7.0	5.040	8.0	5.040
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<p>* The characteristic of AC200V is equal.</p>																								



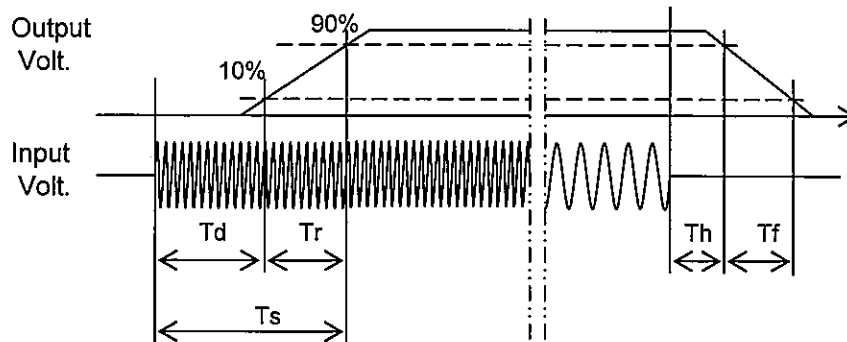
Model		TUNS100F05	Temperature	25°C
Item		Rise and Fall Time	Testing Circuitry	Figure A
Object		+5V20A		

1. Graph



2. Values

Input Volt.	Time	Td	Tr	Ts	Th	Tf
100 V		139.5	2.0	141.5	39.3	1.5
200 V		54.5	2.0	56.0	39.3	1.5





Model		TUNS100F05	Temperature		25°C																																
Item		Hold-Up Time	Testing Circuitry		Figure A																																
Object		+5V20A																																			
1. Graph			2. Values																																		
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230	80	39																																			
264	81	40																																			
280	85	40																																			
--	-	-																																			
<p>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.</p>																																					



<p>Model TUNS100F05</p>		<p>Temperature 25°C Testing Circuitry Figure A</p>																																																			
<p>Item Instantaneous Interruption Compensation</p>																																																					
<p>Object +5V20A</p>																																																					
<p>1.Graph</p> <p> —△— Input Volt. 100V - - - □ - - - Input Volt. 200V ···○··· Input Volt. 230V </p> <p>Instantaneous Compensation Time [ms]</p> <p>Load Current [A]</p>		<p>2.Values</p> <table border="1"> <thead> <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> </thead> <tbody> <tr><td>0.0</td><td>-</td><td>-</td><td>-</td></tr> <tr><td>4.0</td><td>171</td><td>176</td><td>177</td></tr> <tr><td>8.0</td><td>95</td><td>94</td><td>93</td></tr> <tr><td>12.0</td><td>62</td><td>65</td><td>65</td></tr> <tr><td>16.0</td><td>47</td><td>48</td><td>46</td></tr> <tr><td>20.0</td><td>39</td><td>36</td><td>35</td></tr> <tr><td>22.0</td><td>35</td><td>35</td><td>35</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> <tr><td>--</td><td>-</td><td>-</td><td>-</td></tr> </tbody> </table>	Load Current [A]	Time [ms]			Input Volt. 100[V]	Input Volt. 200[V]	Input Volt. 230[V]	0.0	-	-	-	4.0	171	176	177	8.0	95	94	93	12.0	62	65	65	16.0	47	48	46	20.0	39	36	35	22.0	35	35	35	--	-	-	-	--	-	-	-	--	-	-	-	--	-	-	-
Load Current [A]	Time [ms]																																																				
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COSEL																																								
Model	TUNS100F05																																							
Item	Minimum Input Voltage for Regulated Output Voltage	Testing Circuitry Figure A																																						
Object	+5V20A																																							
<p>1. Graph</p> <p style="text-align: right;"> ---□--- Load 50% —△— Load 100% </p>		<p>2. Values</p> <table border="1"> <thead> <tr> <th rowspan="2">Ambient Temperature [°C]</th> <th colspan="2">Input Voltage [V]</th> </tr> <tr> <th>Load 50%</th> <th>Load 100%</th> </tr> </thead> <tbody> <tr><td>-50</td><td>67</td><td>67</td></tr> <tr><td>-40</td><td>67</td><td>67</td></tr> <tr><td>-20</td><td>67</td><td>66</td></tr> <tr><td>0</td><td>66</td><td>66</td></tr> <tr><td>25</td><td>66</td><td>66</td></tr> <tr><td>50</td><td>68</td><td>69</td></tr> <tr><td>75</td><td>65</td><td>65</td></tr> <tr><td>85</td><td>67</td><td>67</td></tr> <tr><td>100</td><td>73</td><td>74</td></tr> <tr><td>105</td><td>74</td><td>76</td></tr> <tr><td>--</td><td>-</td><td>-</td></tr> </tbody> </table>	Ambient Temperature [°C]	Input Voltage [V]		Load 50%	Load 100%	-50	67	67	-40	67	67	-20	67	66	0	66	66	25	66	66	50	68	69	75	65	65	85	67	67	100	73	74	105	74	76	--	-	-
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COSEL																																															
Model	TUNS100F05	Temperature	25°C																																												
Item	Overcurrent Protection	Testing Circuitry	Figure A																																												
Object	+5V20A																																														
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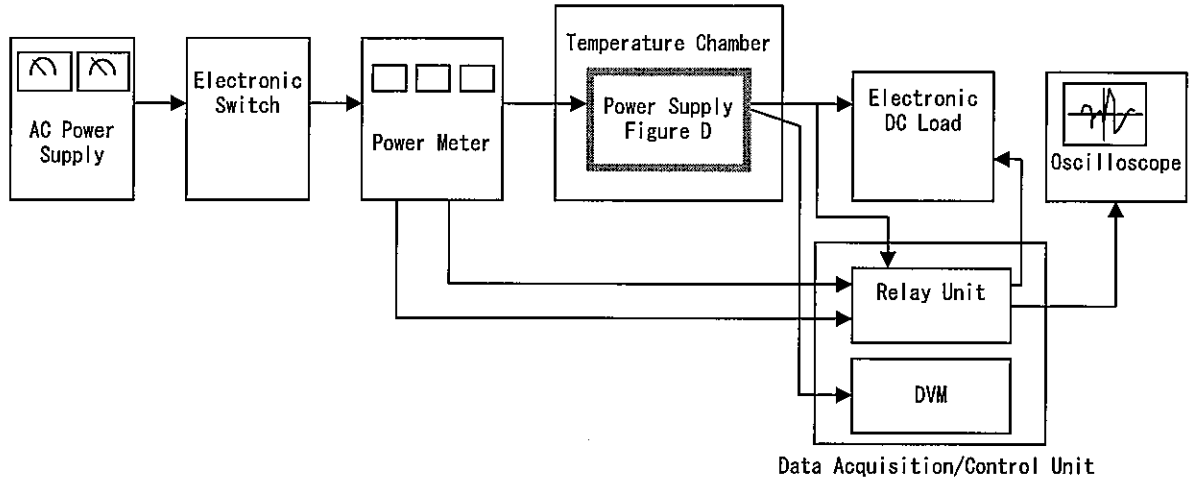


Figure A

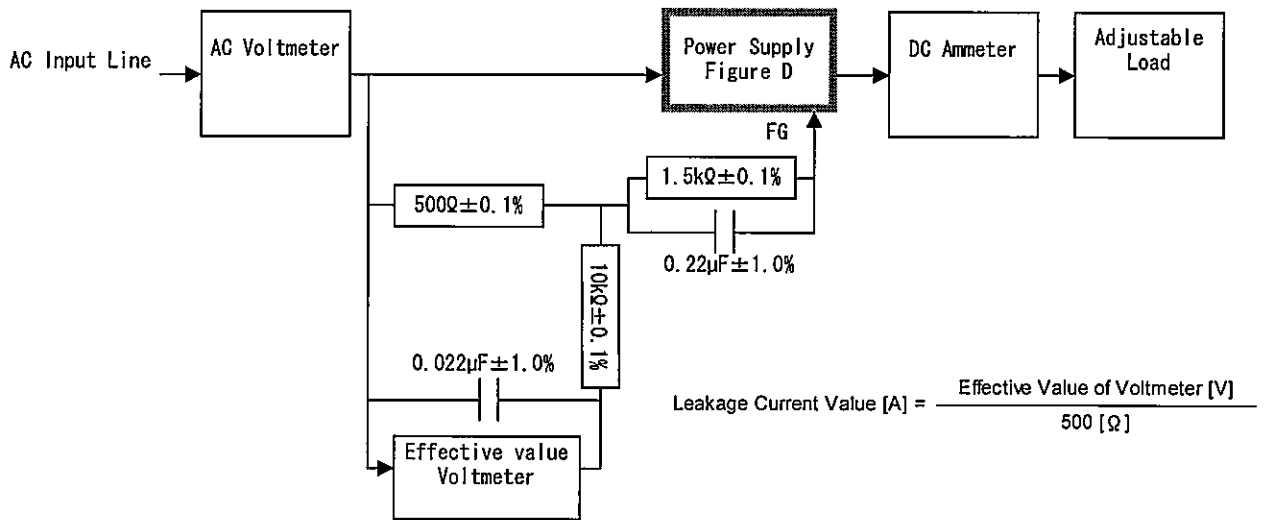


Figure B (IEC60950-1)

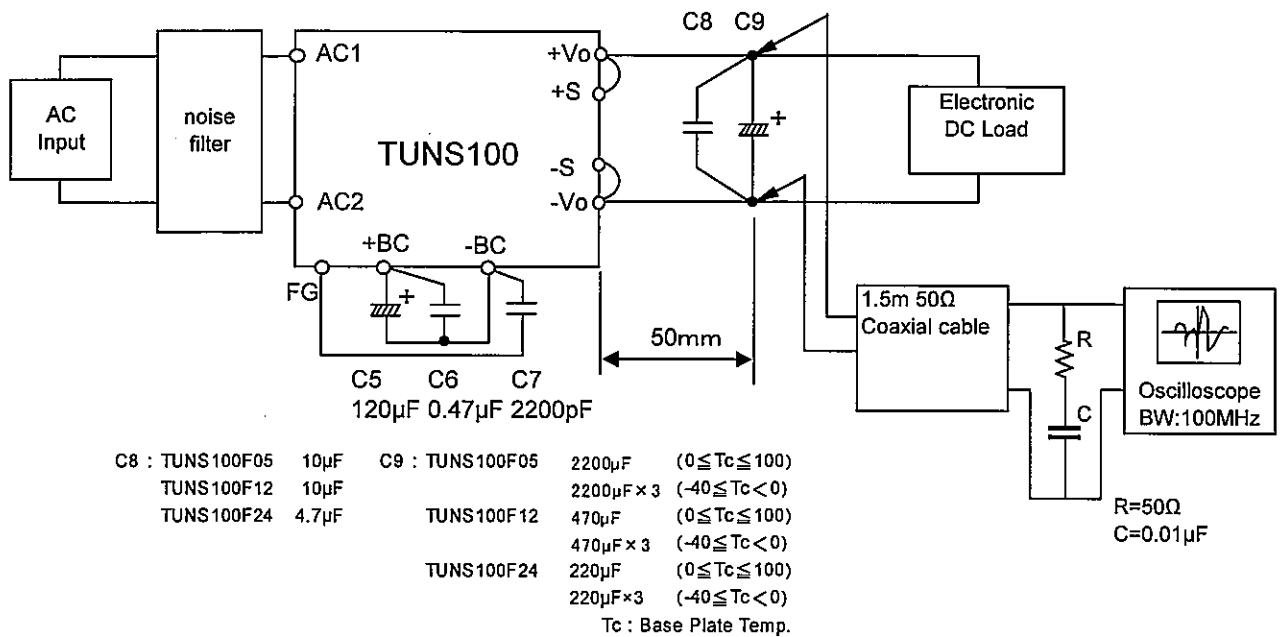
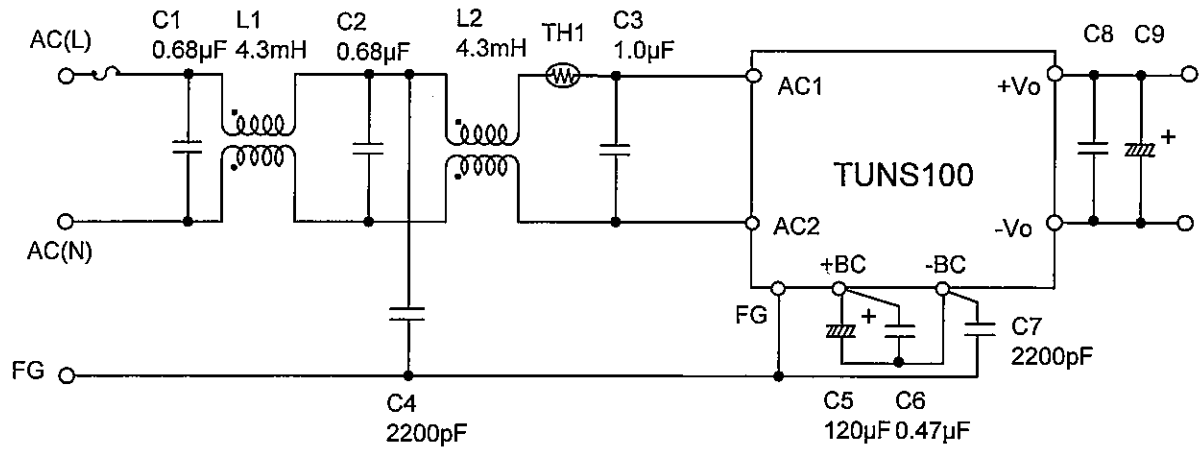


Figure C



- | | | | | | |
|----------------------------------|-----------------|-------------------------|---------------------------|---------------------------|---------------------------|
| L1,L2 : SSB11V-R17043(NEC TOKIN) | C9 : TUNS100F05 | 2200 μ F | ($0 \leq T_c \leq 100$) | | |
| TH1 : 8D2-11(SEMITEC) | | 2200 μ F \times 3 | ($-40 \leq T_c < 0$) | | |
| C8 : TUNS100F05 | 10 μ F | TUNS100F12 | 470 μ F | ($0 \leq T_c \leq 100$) | |
| | TUNS100F12 | 10 μ F | 470 μ F \times 3 | ($-40 \leq T_c < 0$) | |
| | TUNS100F24 | 4.7 μ F | TUNS100F24 | 220 μ F | ($0 \leq T_c \leq 100$) |
| | | | 220 μ F \times 3 | ($-40 \leq T_c < 0$) | |
- T_c : Base Plate Temp.

Figure D