COSEL

TEST DATA OF GT4-15

Regulated DC Power Supply
July 23, 2010

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COSEL CO.,LTD.

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Item	Input Current (by Load Current)
Object	————

Temperature 25°C
Testing Circuitry Figure A

1. Graph

————△———— Input Volt. 90V
– – –⊟– – – Input Volt. 100V
—·–○—·– Input Volt. 110V

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

2. Values

Load Current [A]	Input Current [A]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
0.0	0.037	0.039	0.041
0.8	0.410	0.419	0.426
1.6	0.722	0.736	0.748
2.4	1.008	1.028	1.045
3.2	1.274	1.298	1.320
4.0	1.536	1.564	1.590
4.8	1.786	1.820	1.850
5.0	1.846	1.883	1.914
5.5	2.000	2.036	2.072
---	-	-	-
---	-	-	-

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Model	GT4-15
Item	Input Power (by Load Current)
Object	

Temperature 25°C
Testing Circuitry Figure A

1.Graph

——△—— Input Volt. 90V
---🔲--- Input Volt. 100V
—·—○—·— Input Volt. 110V

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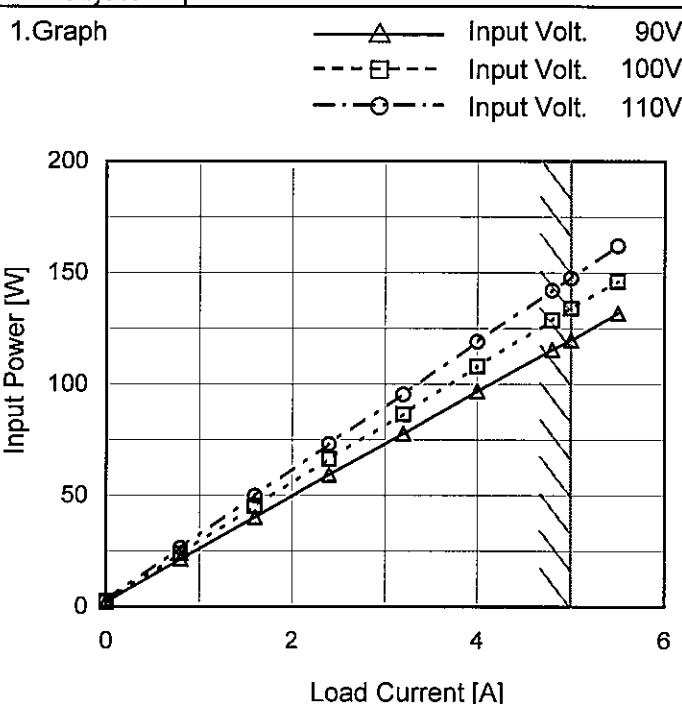
2.Values

Load Current [A]	Input Power [W]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
0.0	2.1	2.5	2.9
0.8	21.4	23.8	26.5
1.6	40.3	45.1	49.9
2.4	59.4	66.4	73.2
3.2	77.8	86.5	95.4
4.0	96.9	108.0	119.1
4.8	115.5	128.7	142.1
5.0	119.7	134.1	147.6
5.5	131.7	146.1	162.0
--	-	-	-
--	-	-	-

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Model	GT4-15
Item	Efficiency (by Input Voltage)
Object	————————————

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

--- ⊟ ---   Load 50%
———— △ ————   Load 100%

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

2.Values

Input Voltage [V]	Efficiency [%]	
	Load 50%	Load 100%
85	64.4	66.1
90	60.8	62.6
100	54.5	56.2
110	49.4	50.9
115	47.2	48.6
--	-	-
--	-	-
--	-	-
--	-	-

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Model	GT4-15
Item	Efficiency (by Load Current)
Object	

Temperature   25°C
Testing Circuitry   Figure A

1. Graph

    ———△——— Input Volt.   90V
    - - -☐- - - Input Volt. 100V
    —·—⊖—··— Input Volt. 110V

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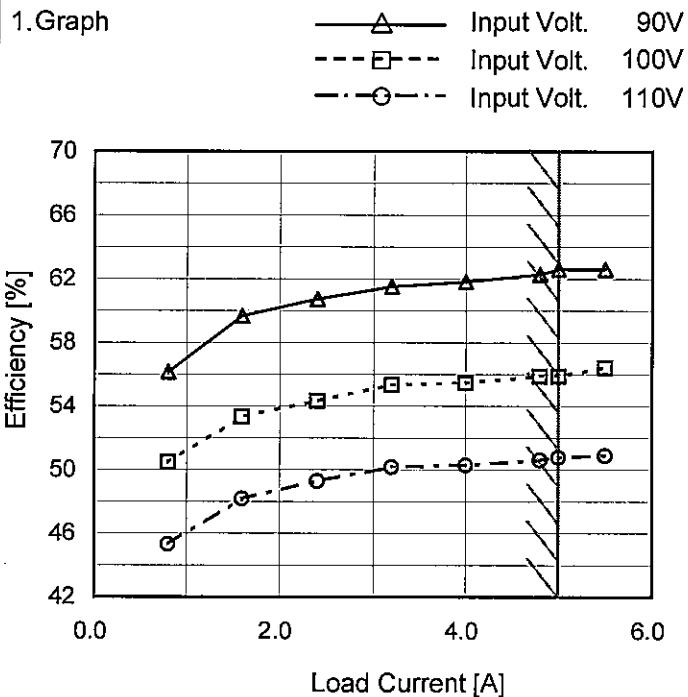
2. Values

Load Current	Efficiency [%]		
	Input Volt.	Input Volt.	Input Volt.
[A]	90[V]	100[V]	110[V]
0.0	-	-	-
0.8	56.1	50.5	45.3
1.6	59.7	53.3	48.2
2.4	60.7	54.3	49.3
3.2	61.5	55.3	50.2
4.0	61.8	55.5	50.3
4.8	62.3	55.9	50.6
5.0	62.6	55.9	50.8
5.5	62.6	56.4	50.9
--	-	-	-
--	-	-	-

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Model	GT4-15
Item	Power Factor (by Input Voltage)
Object	

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

--- ⊟ ---   Load 50%
——— △ ———   Load 100%

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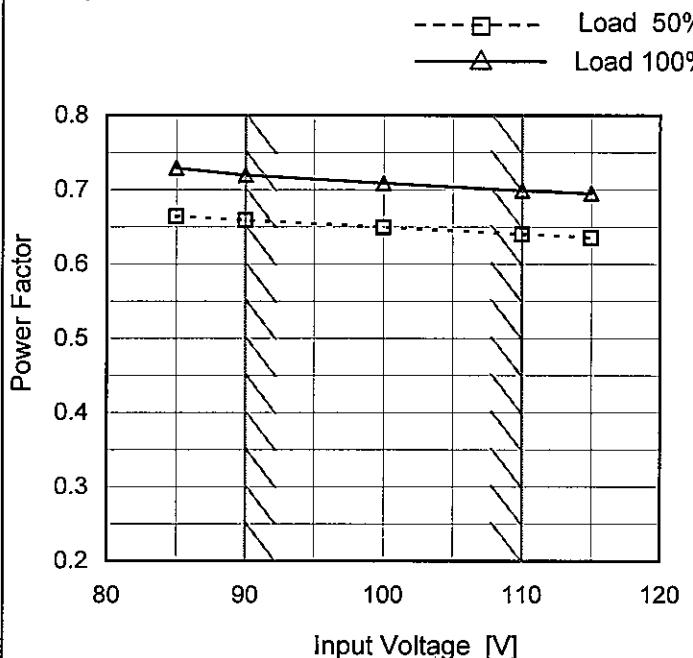
2.Values

Input Voltage [V]	Power Factor	
	Load 50%	Load 100%
85	0.664	0.729
90	0.659	0.720
100	0.649	0.709
110	0.640	0.699
115	0.635	0.695
--	-	-
--	-	-
--	-	-
--	-	-

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Model	GT4-15
Item	Power Factor (by Load Current)
Object	
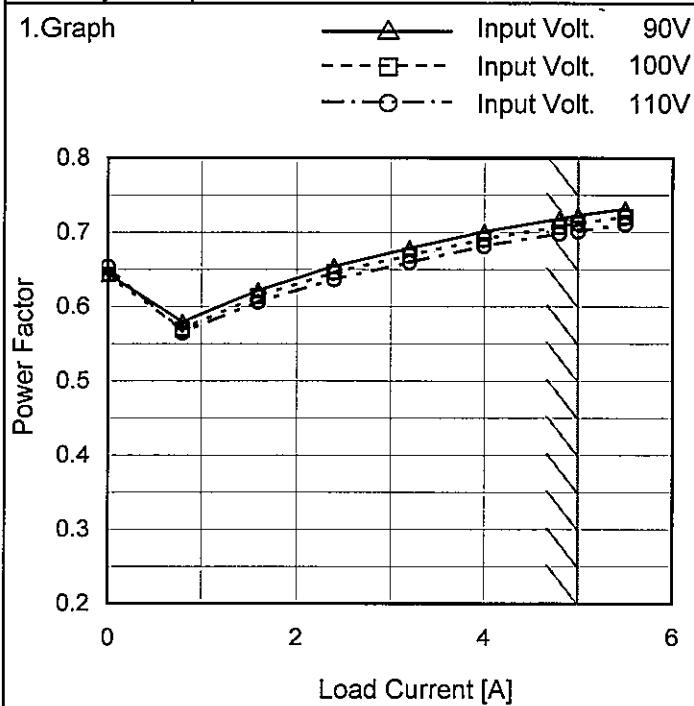
Temperature   25°C
Testing Circuitry   Figure A

1.Graph

— △ — Input Volt.   90V
--- ⊟ --- Input Volt.   100V
—·—○—·— Input Volt.   110V

Load Current [A]

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

2.Values

Load Current [A]	Power Factor		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
0.0	0.644	0.643	0.654
0.8	0.580	0.569	0.565
1.6	0.622	0.614	0.606
2.4	0.655	0.646	0.637
3.2	0.679	0.669	0.659
4.0	0.701	0.691	0.681
4.8	0.719	0.708	0.698
5.0	0.723	0.712	0.701
5.5	0.732	0.721	0.711
--	-	-	-
--	-	-	-

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Model	GT4-15
Item	Inrush Current
Object	———————

Temperature	25°C
Testing Circuitry	Figure A

Input
Current
[20A/div]

Input
Voltage
[100V/div]

Time   [10ms/div]
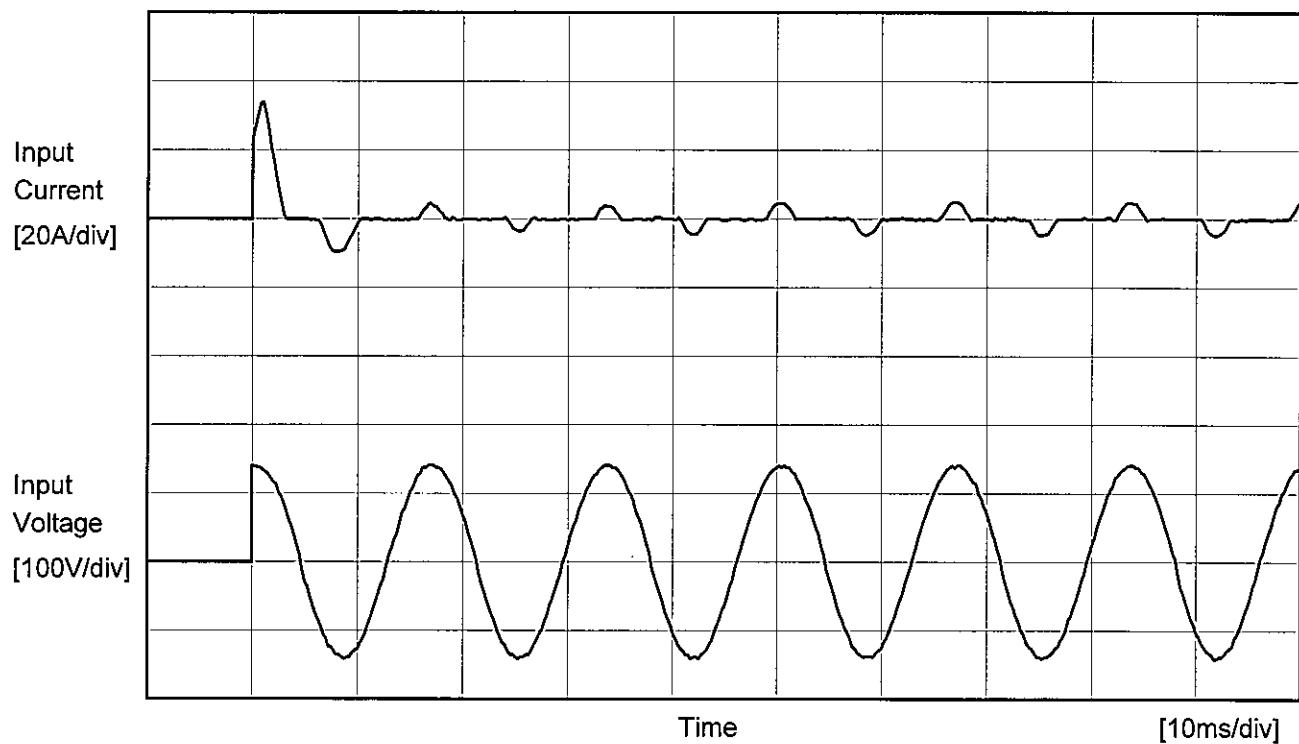
Input Voltage	100 V
Frequency	60 Hz
Load	100 %
Primary inrush current	34.0 A

Primary inrush current
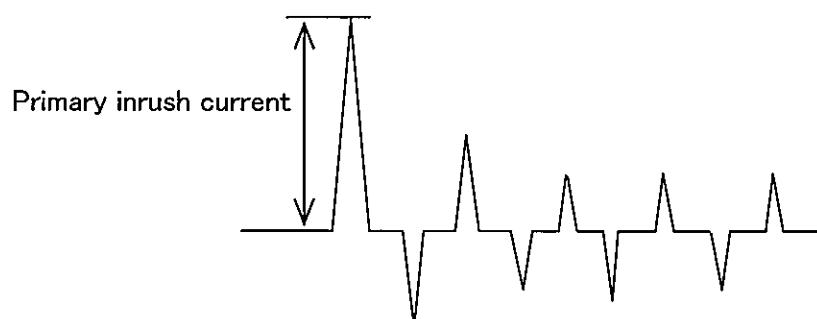
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Model	GT4-15
Item	Line Regulation
Object	+15V5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

```
--- ⊟ --- Load 50%
—— △ —— Load 100%
```

Output Voltage [V] vs Input Voltage [V]

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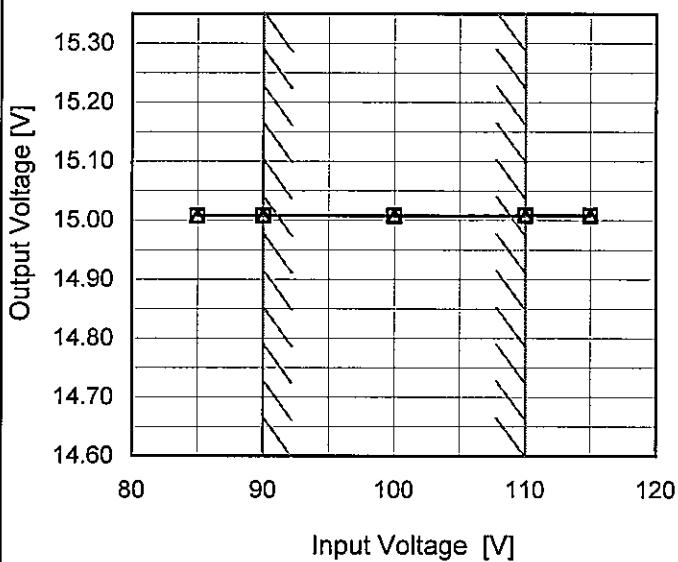
2.Values

Input Voltage [V]	Output Voltage [V]	
	Load 50%	Load 100%
85	15.007	15.008
90	15.008	15.008
100	15.008	15.008
110	15.008	15.008
115	15.009	15.009
--	-	-
--	-	-
--	-	-
--	-	-

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Model	GT4-15
Item	Load Regulation
Object	+15V5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

———△——— Input Volt. 90V
— — —◻— — — Input Volt. 100V
—·—O—·· Input Volt. 110V

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

2.Values

Load Current [A]	Output Voltage [V]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
0.0	15.009	15.009	15.010
0.8	15.009	15.009	15.009
1.6	15.009	15.009	15.009
2.4	15.009	15.009	15.010
3.2	15.009	15.009	15.009
4.0	15.009	15.009	15.009
4.8	15.009	15.009	15.009
5.0	15.009	15.009	15.009
5.5	15.009	15.009	15.009
--	-	-	-
--	-	-	-

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Model	GT4-15
Item	Dynamic Load Response
Object	+15V5A

|	
Temperature	25°C
Testing Circuitry	Figure A

Input Volt. 100 V
Cycle 1000 ms

Load Current

Min. Load (0A) ←→
Load 100% (5A)

200 mV/div

100 µs/div 100 µs/div

Load 50% (2.5A) ←→
Load 100% (5A)

200 mV/div

100 µs/div 100 µs/div

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Model	GT4-15
Item	Ripple Voltage (by Load Current)
Object	+15V5A
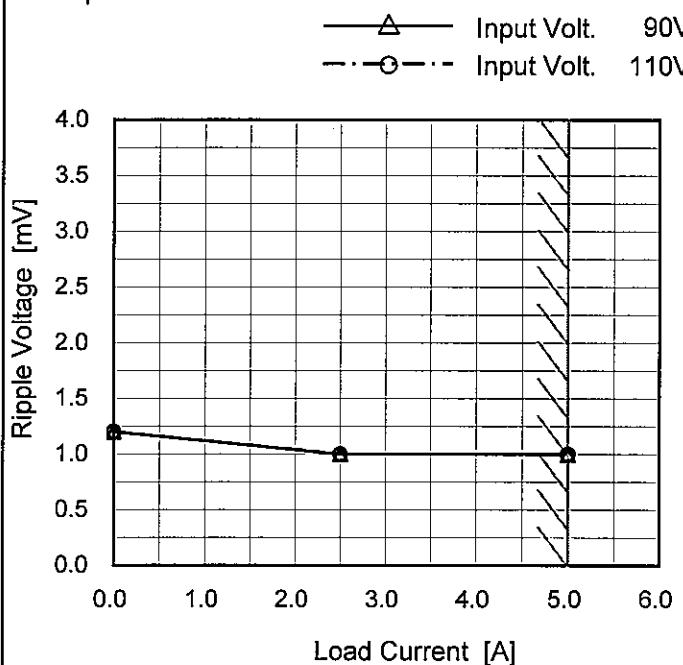
Temperature   25°C
Testing Circuitry   Figure A

1.Graph

——△—— Input Volt.   90V
—·—O—·— Input Volt.   110V

Ripple Voltage [mV] vs Load Current [A]

Measured by 20 MHz Oscilloscope.
Note: Slanted line shows the range of the rated
      load current.

2.Values

Load Current [A]	Ripple Voltage [mV]	
	Input Volt. 90 [V]	Input Volt. 110 [V]
0.0	1.2	1.2
2.5	1.0	1.0
5.0	1.0	1.0
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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Model	GT4-15
Item	Ripple Voltage (by Ambient Temp.)
Object	+15V5A
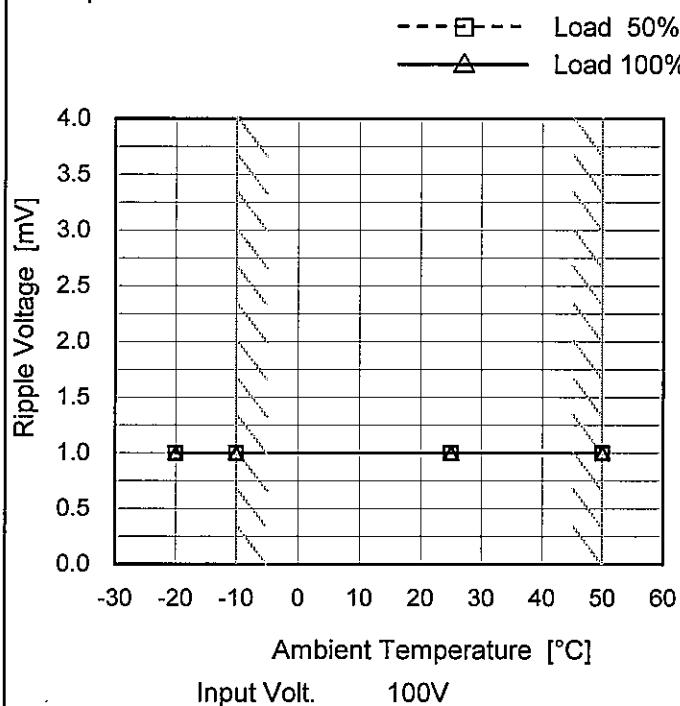
Testing Circuitry   Figure A

1.Graph

--- ⊟ --- Load 50%
——△—— Load 100%

Ambient Temperature [°C]

Input Volt.   100V

Measured by 20 MHz Oscilloscope.
Note: Slanted line shows the range of the rated
ambient temperature.

2.Values

Ambient Temperature [°C]	Ripple Voltage [mV]	
	Load 50%	Load 100%
-20	1.0	1.0
-10	1.0	1.0
25	1.0	1.0
50	1.0	1.0
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-
--	-	-

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Model	GT4-15
Item	Ambient Temperature Drift
Object	+15V5A
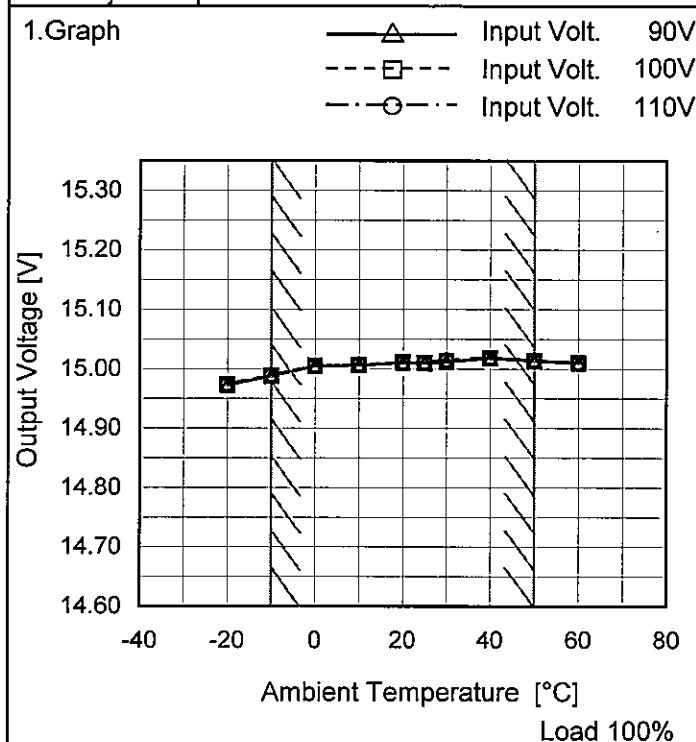
Testing Circuitry   Figure A

1.Graph

———△——— Input Volt.   90V
- - -⊟- - - Input Volt.   100V
—·—⊖—·— Input Volt.   110V

Ambient Temperature [°C]

Load 100%

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

2.Values

Ambient Temperature [°C]	Output Voltage [V]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
-20	14.973	14.973	14.974
-10	14.988	14.989	14.989
0	15.005	15.005	15.005
10	15.007	15.007	15.007
20	15.011	15.011	15.011
25	15.010	15.010	15.010
30	15.012	15.013	15.015
40	15.018	15.019	15.019
50	15.014	15.014	15.014
60	15.010	15.010	15.011
--	-	-	-

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Model	GT4-15	
Item	Output Voltage Accuracy	Testing Circuitry Figure A
Object	+15V5A	

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 : 90 - 110V

Load Current : 0 - 5A

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

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

2.Values

Item	Temperature [°C]	Input Voltage[V]	Output		Output Voltage Accuracy	
			Current[A]	Voltage[V]	Value [mV]	Ration [%]
Maximum Voltage	40	110	0	15.019	±16	±0.1
Minimum Voltage	-10	90	0	14.987		

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Model	GT4-15
Item	Time Lapse Drift
Object	+15V5A

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	15.007
0.5	15.011
1.0	15.011
2.0	15.011
3.0	15.010
4.0	15.011
5.0	15.011
6.0	15.011
7.0	15.011
8.0	15.011

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Model	GT4-15
Item	Rise and Fall Time
Object	+15V5A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

Input Volt.   100 V

Load 50%

Output
Volt.

[2V/div]

0

Load 100%

Output
Volt.

[2V/div]

0

Input
Volt.

0

[100V/div]   Time   [50ms/div]   Time   [100ms/div]
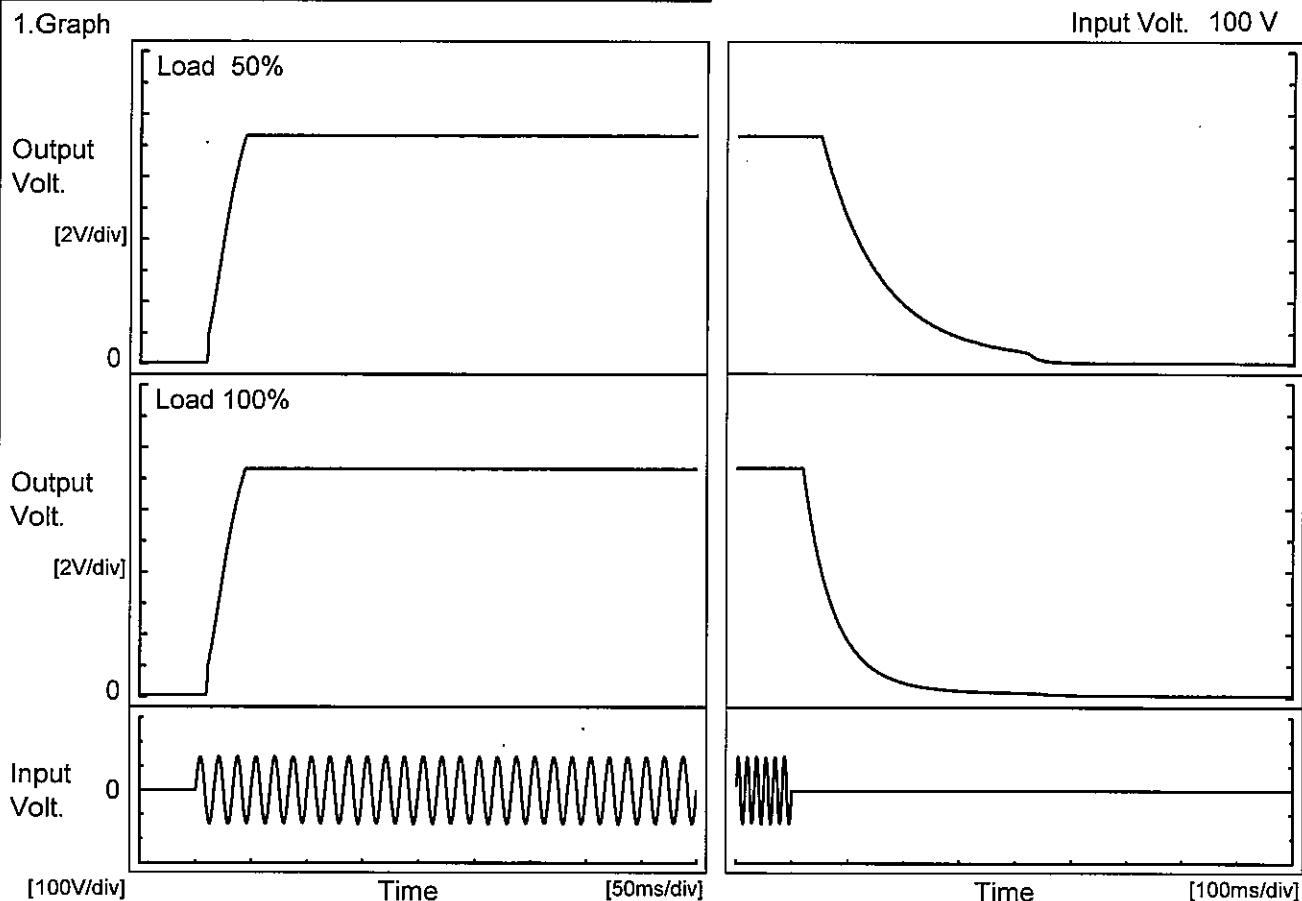
2.Values

[ms]

Load ⟍ Time	Td	Tr	Ts	Th	Tf
50 %	11.0	29.3	40.3	58.0	257.0
100 %	10.8	29.3	40.1	23.5	133.0

Output
Volt.

90%

10%

Input
Volt.

Td   Tr   Th Tf

Ts

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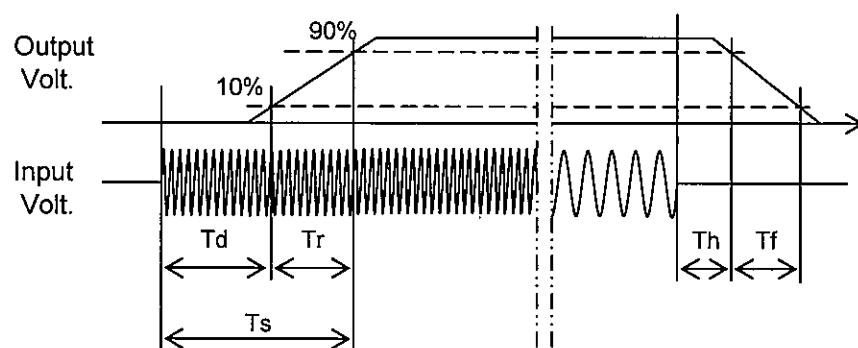
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Model	GT4-15
Item	Hold-Up Time
Object	+15V5A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

--- ⊟ --- Load 50%
—— △ —— Load 100%

Hold-Up Time [ms] vs Input Voltage [V]
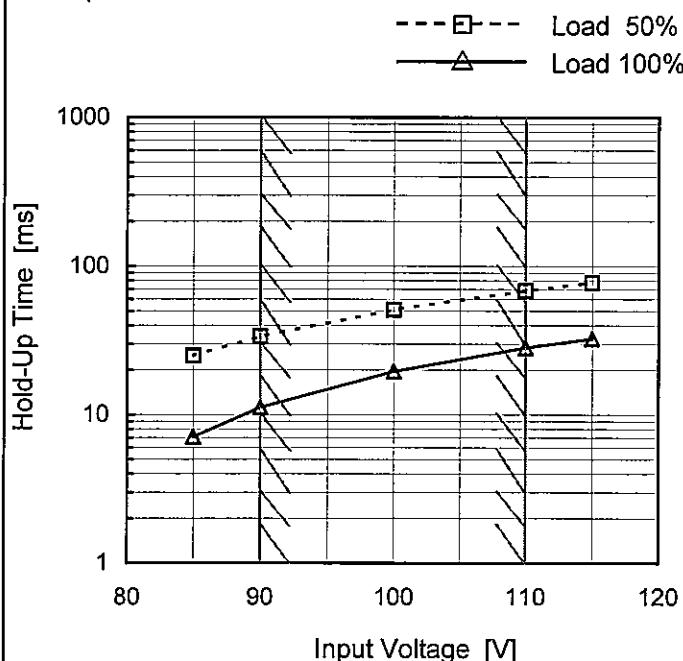
2.Values

Input Voltage [V]	Hold-Up Time [ms]	
	Load 50%	Load 100%
85	25	7
90	34	11
100	51	20
110	68	28
115	77	33
--	-	-
--	-	-
--	-	-
--	-	-

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.

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Model	GT4-15
Item	Instantaneous Interruption Compensation
Object	+15V5A

Temperature 25°C
Testing Circuitry Figure A

1.Graph

⎯△⎯ Input Volt. 90V
---⊟--- Input Volt. 100V
—·—○—·· Input Volt. 110V

Instantaneous Compensation Time [ms] vs Load Current [A]

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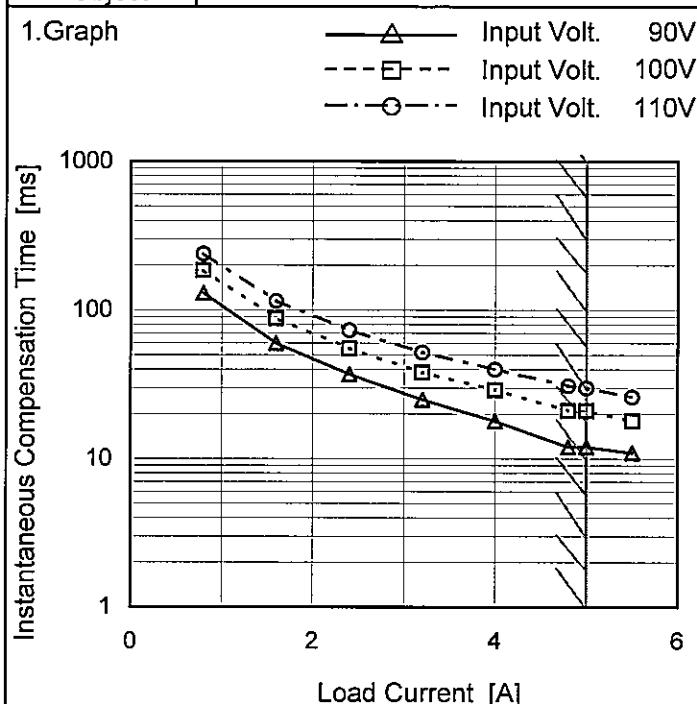
2.Values

Load Current [A]	Time [ms]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
0.0	-	-	-
0.8	130	185	239
1.6	60	88	115
2.4	37	55	73
3.2	25	38	52
4.0	18	29	40
4.8	12	21	31
5.0	12	21	30
5.5	11	18	26
--	-	-	-
--	-	-	-

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Model	GT4-15
Item	Minimum Input Voltage for Regulated Output Voltage
Object	+15V5A

Testing Circuitry   Figure A

1.Graph

--- ⊟ --- Load 50%
——△—— Load 100%

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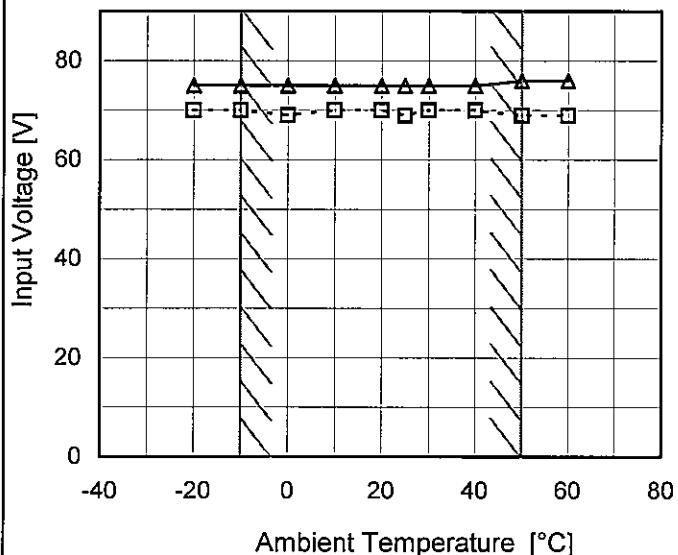
2.Values

Ambient Temperature [°C]	Input Voltage [V]	
	Load 50%	Load 100%
-20	70	75
-10	70	75
0	69	75
10	70	75
20	70	75
25	69	75
30	70	75
40	70	75
50	69	76
60	69	76
--	-	-

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Model	GT4-15
Item	Overcurrent Protection
Object	+15V5A

Temperature   25°C
Testing Circuitry   Figure A

1.Graph

———— Input Volt.   90V
———— Input Volt.   100V
———— Input Volt.   110V

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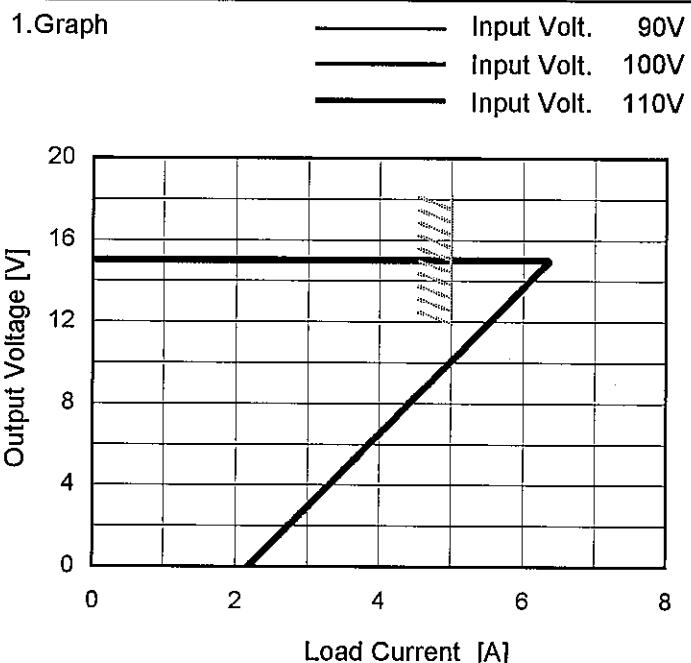
2.Values

Output Voltage [V]	Load Current [A]		
	Input Volt. 90[V]	Input Volt. 100[V]	Input Volt. 110[V]
15.0	6.37	6.37	6.36
14.3	6.13	6.13	6.13
13.5	6.04	6.03	6.03
12.0	5.56	5.56	5.56
10.5	5.18	5.18	5.17
9.0	4.75	4.75	4.74
7.5	4.29	4.28	4.28
6.0	3.88	3.88	3.88
4.5	3.45	3.45	3.45
3.0	3.04	3.04	3.04
1.5	2.61	2.61	2.61
0.0	2.17	2.17	2.17

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Figure A