CUS250LD

EVALUATION DATA

DWG.No. CA802-53-01/LD		
APPD	CHK	DWG
Theo 16-Jan-13	Andrew 09-Jan-13	Penny 09-Jan-'13

INDEX

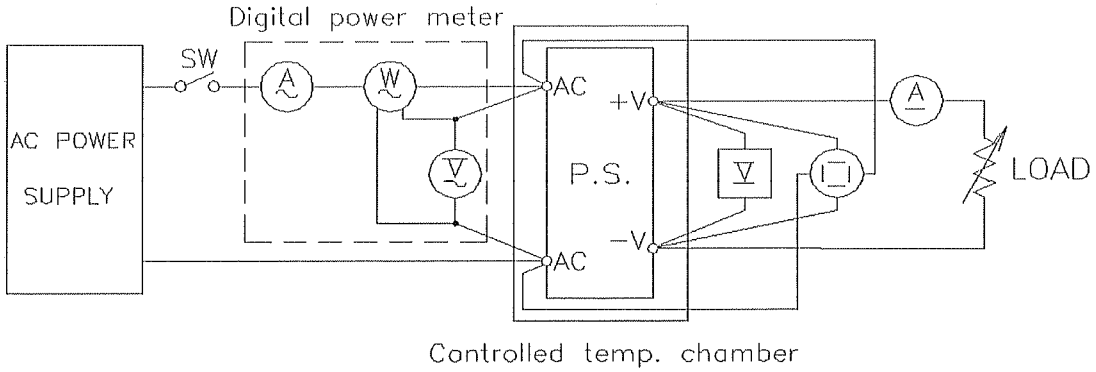
Terminology used

	Definition
Vin	..... Input voltage
Vout	..... Output voltage
Iin	..... Input current
Iout	..... Output current
Ta	..... Ambient temperature
f	..... Frequency
FG	..... Frame Ground

1. Evaluation method

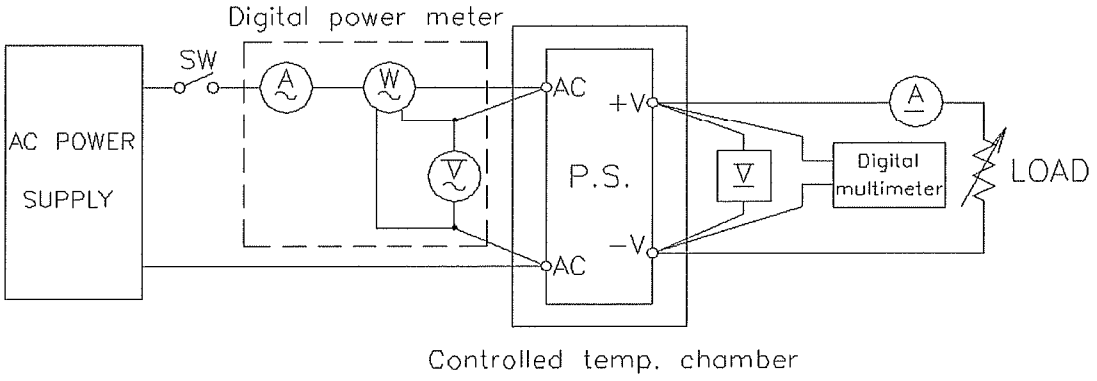
1.1 Circuit used for determination

(1) Steady state data



(2) Warm up voltage drift characteristics
Same as Steady state data

(3) Over current protection (OCP) characteristics

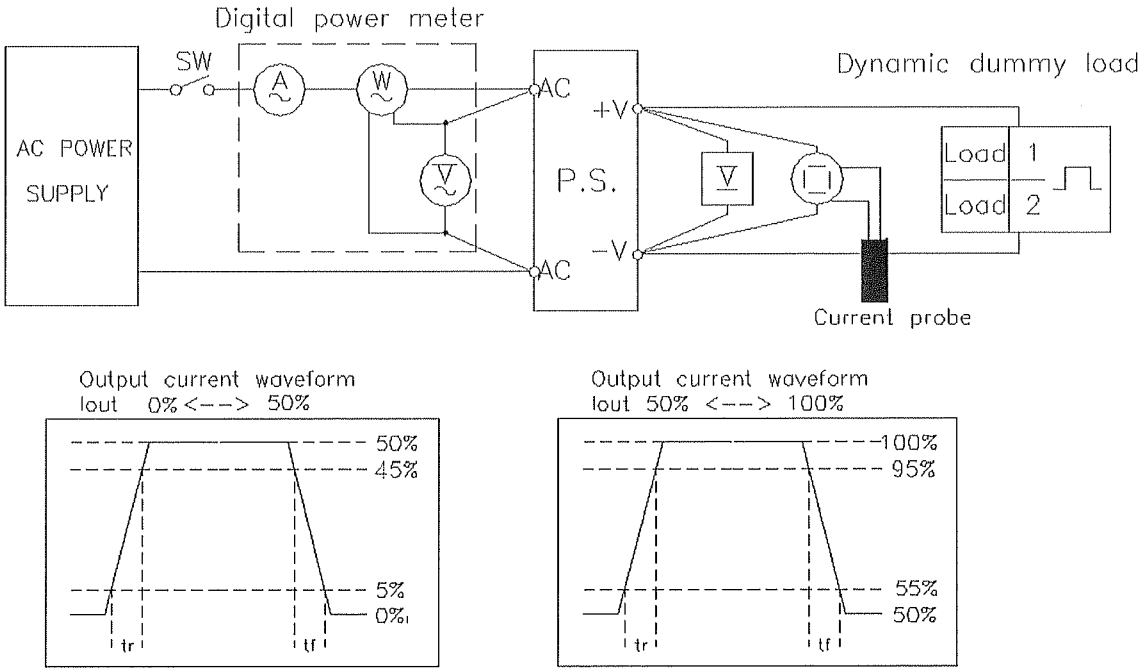


(4) Over voltage protection (OVP) characteristics
Same as Steady state data

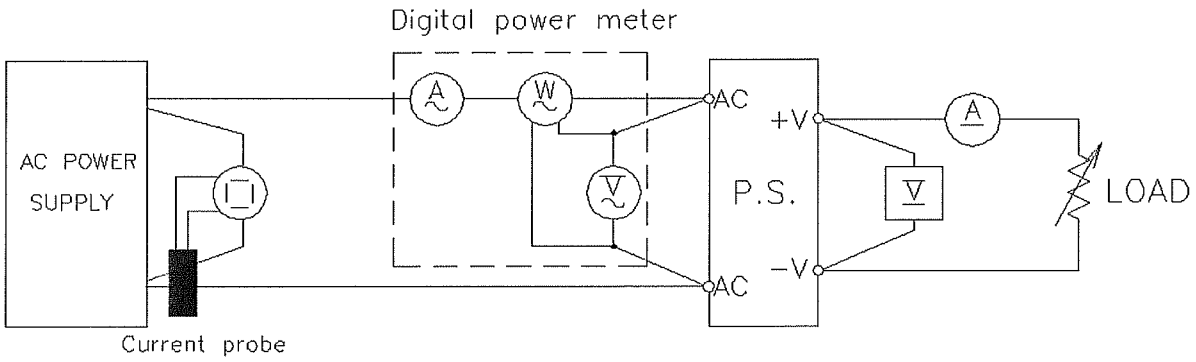
(5) Output rise characteristics
Same as Steady state data

(6) Output fall characteristics
Same as Steady state data

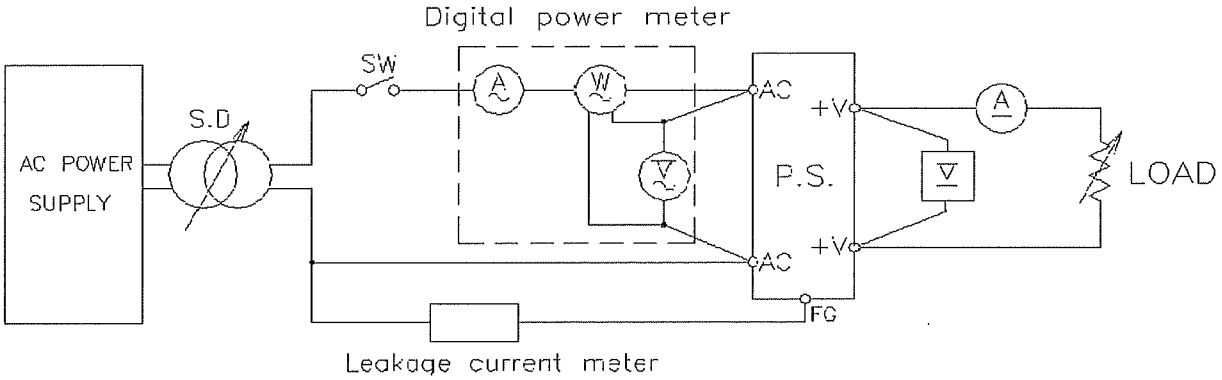
(7) Dynamic load response characteristics



(8) Inrush current characteristics



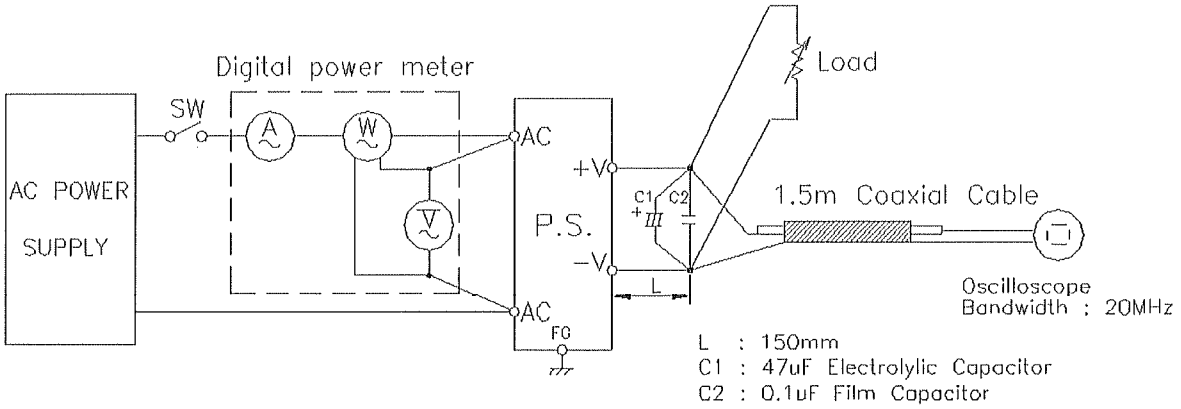
(9) Leakage current characteristics



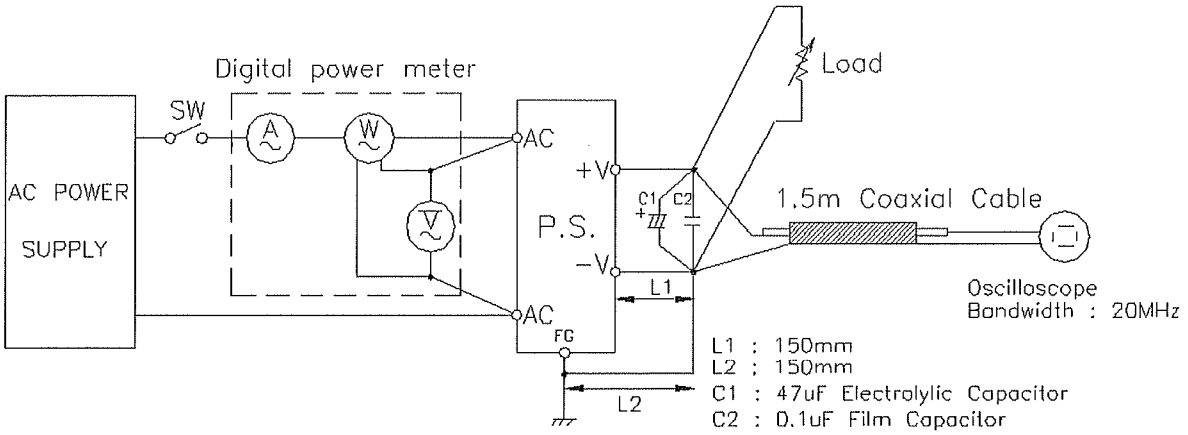
Range used---AC (For SIMPSON TYPE 228)

(10) Output ripple and noise waveform

(a) Normal Mode (using a twisted pair terminated with 0.1uF and 47uF capacitor at 20MHz)

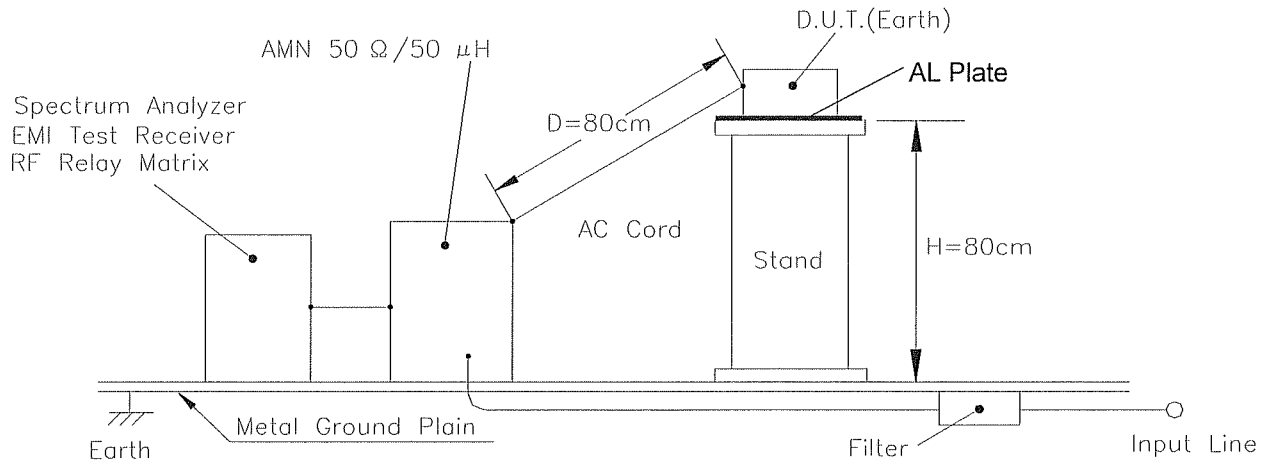


(b) Normal + Common Mode



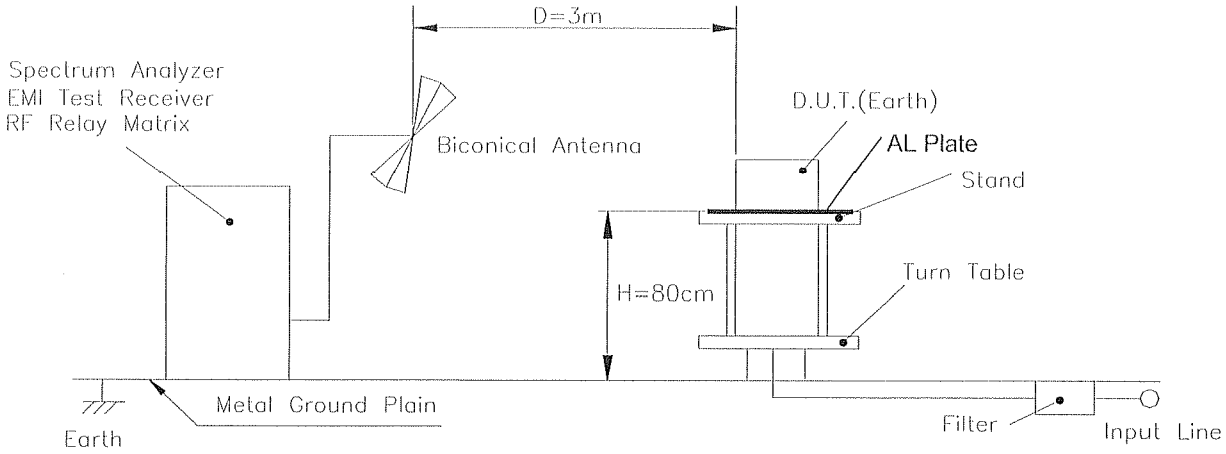
(11) Electro-Magnetic Interference characteristics

(a) Conducted Emission Noise



(11) Electro-Magnetic Interference characteristics

(b) Radiated Emission Noise



1.2 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	DIGITAL STORAGE OSCILLOSCOPE	LECROY	WS454
2	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA	DLM2054
3	DIGITAL MULTIMETER	FLUKE	45
4	DIGITAL POWER METER	YOKOGAWA	WT110/WT210
5	CURRENT PROBE/AMPLIFIER	YOKOGAWA	701930
6	DYNAMIC DUMMY LOAD	CHROMA	63201
7	CONTROLLED TEMP. CHAMBER	ESPEC	SU-661/SH-661
8	LEAKAGE CURRENT METER	SIMPSON	228
9	AC SOURCE	CHROMA	61605/6530
10	POWER ANALYZER	CHROMA	6630
11	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI-03
12	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESI26
13	LISN	ROHDE&SCHWARZ	ENV216
14	ANTENNA	ROHDE&SCHWARZ	HL562

2. Characteristics

2.1 Steady state data

(1) Regulation - line and load, Temperature drift

3V

1. Regulation-line and load — Condition: Ta : 25°C

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	line regulation	
0%	3.304V	3.305V	3.305V	3.305V	0.001V	0.030%
20%	3.304V	3.304V	3.304V	3.304V	0.000V	0.000%
40%	3.303V	3.303V	3.303V	3.304V	0.001V	0.030%
60%	3.304V	3.304V	3.304V	3.304V	0.000V	0.000%
80%	3.304V	3.304V	3.304V	3.304V	0.000V	0.000%
100%	3.304V	3.304V	3.304V	3.304V	0.000V	0.000%
load	0.001V	0.001V	0.001V	0.001V		
regulation	0.030%	0.030%	0.030%	0.030%		

2. Temperature drift — Conditions: Vin = 115VAC, Iout = 100%

Ta	-25°C	+25°C	+40°C	temperature stability	
Vout	3.301V	3.304V	3.305V	0.004V	0.127%

4V

1. Regulation-line and load — Condition: Ta : 25°C

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	line regulation	
0%	4.206V	4.206V	4.206V	4.206V	0.000V	0.000%
20%	4.206V	4.206V	4.206V	4.206V	0.000V	0.000%
40%	4.206V	4.206V	4.206V	4.206V	0.000V	0.000%
60%	4.205V	4.205V	4.206V	4.206V	0.001V	0.024%
80%	4.205V	4.205V	4.205V	4.206V	0.001V	0.024%
100%		4.206V	4.205V	4.205V	0.001V	0.024%
load	0.001V	0.001V	0.001V	0.001V		
regulation	0.024%	0.024%	0.024%	0.024%		

2. Temperature drift — Conditions: Vin =115VAC, Iout =100%

Ta	-25°C	+25°C	+40°C	temperature stability	
Vout	4.200V	4.206V	4.202V	0.006V	0.049%

2.1 Steady state data

(1) Regulation - line and load, Temperature drift

5V

1. Regulation-line and load — Condition: Ta : 25°C

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	line regulation	
0%	5.005V	5.005V	5.004V	5.004V	0.001V	0.020%
20%	5.012V	5.012V	5.012V	5.012V	0.000V	0.000%
40%	5.012V	5.012V	5.012V	5.012V	0.000V	0.000%
60%	5.012V	5.012V	5.012V	5.012V	0.000V	0.000%
80%	5.011V	5.011V	5.011V	5.011V	0.000V	0.000%
100%		5.012V	5.012V	5.012V	0.000V	0.000%
load regulation	0.007V	0.007V	0.008V	0.008V		
	0.140%	0.140%	0.160%	0.160%		

2. Temperature drift — Conditions: Vin = 115VAC, Iout = 100%

Ta	-25°C	+25°C	+40°C	temperature stability	
Vout	5.005V	5.012V	5.010V	0.007V	0.140%

12V

1. Regulation-line and load — Condition: Ta : 25°C

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	line regulation	
0%	12.011V	12.012V	12.012V	12.012V	0.001V	0.008%
20%	12.007V	12.007V	12.009V	12.009V	0.002V	0.017%
40%	12.004V	12.004V	12.005V	12.005V	0.001V	0.008%
60%	12.002V	12.002V	12.002V	12.003V	0.001V	0.008%
80%	12.000V	12.000V	12.001V	12.001V	0.001V	0.008%
100%		12.000V	12.000V	11.999V	0.001V	0.008%
load regulation	0.011V	0.012V	0.012V	0.013V		
	0.092%	0.100%	0.100%	0.108%		

2. Temperature drift — Conditions: Vin =115VAC, Iout =100%

Ta	-25°C	+25°C	+40°C	temperature stability	
Vout	11.990V	12.000V	11.985V	0.015V	0.122%

2.1 Steady state data

(1) Regulation - line and load, Temperature drift

24V

1. Regulation-line and load

Condition: Ta : 25°C

Iout \ Vin	85VAC	115VAC	230VAC	265VAC	line regulation	
0%	24.029V	24.029V	24.030V	24.031V	0.002V	0.008%
20%	24.026V	24.026V	24.026V	24.026V	0.000V	0.000%
40%	24.023V	24.023V	24.024V	24.024V	0.001V	0.004%
60%	24.022V	24.022V	24.022V	24.022V	0.000V	0.000%
80%	24.020V	24.020V	24.021V	24.022V	0.002V	0.008%
100%		24.020V	24.020V	24.020V	0.000V	0.000%
load	0.009V	0.009V	0.010V	0.011V		
regulation	0.038%	0.038%	0.042%	0.046%		

2. Temperature drift

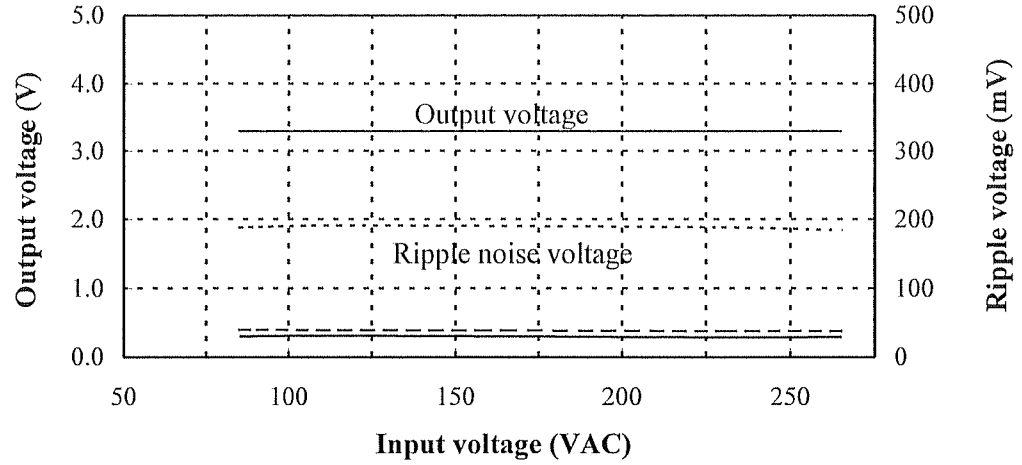
Conditions: Vin = 115VAC
Iout = 100%

Ta	-25°C	+25°C	+40°C	temperature stability	
Vout	24.016V	24.020V	23.960V	0.060V	0.250%

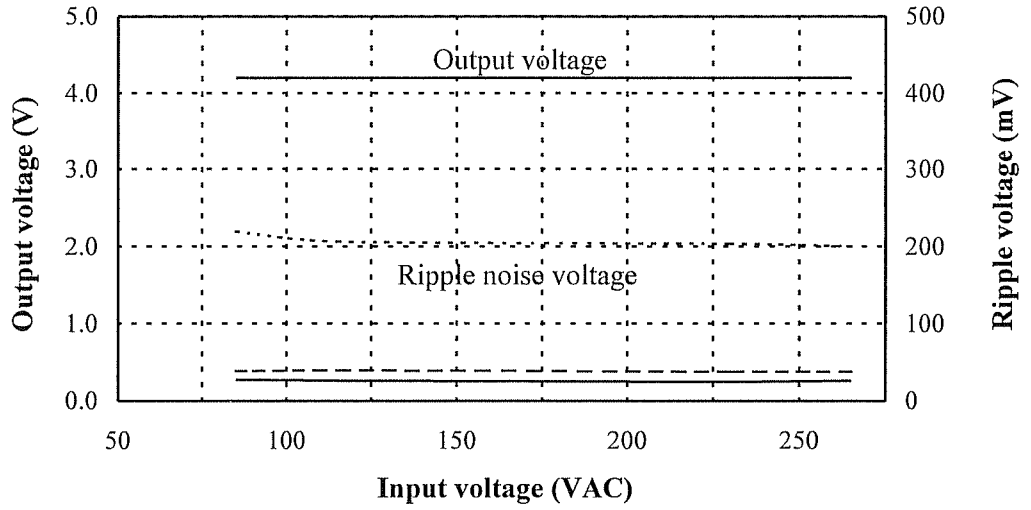
(2) Output voltage and Ripple voltage vs. Input voltage

Conditions: Iout : 100%
Ta : -25°C
: 25°C
: 40°C

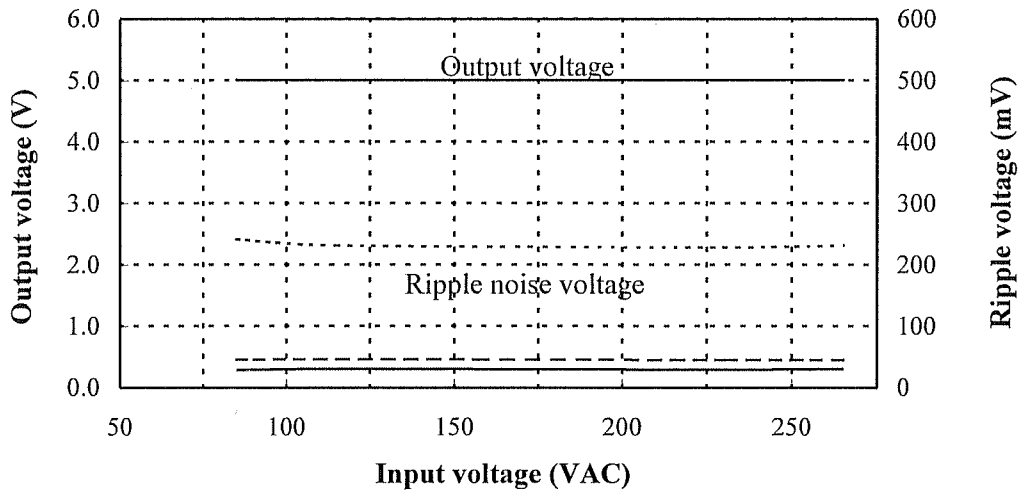
3V



4V



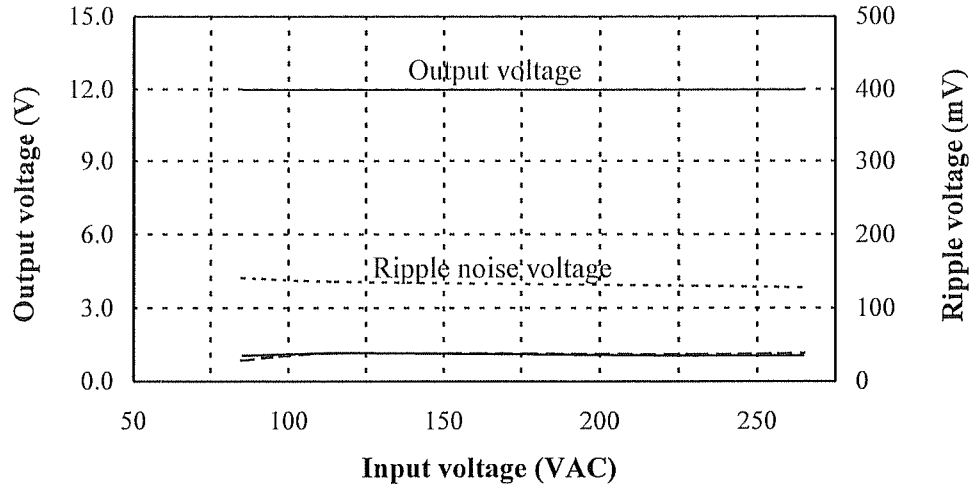
5V



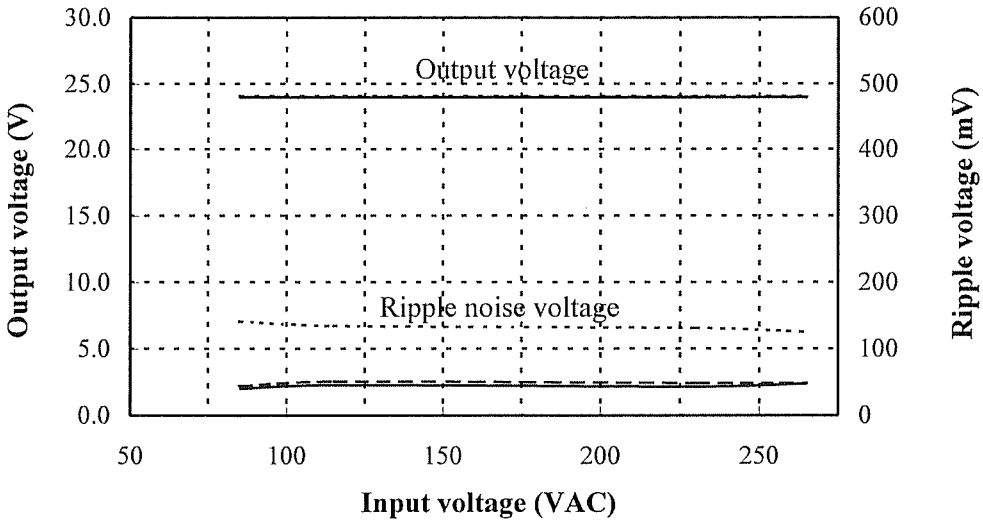
(2) Output voltage and Ripple voltage vs. Input voltage

Conditions: Iout : 100%
Ta : -25°C
: 25°C
: 40°C

12V

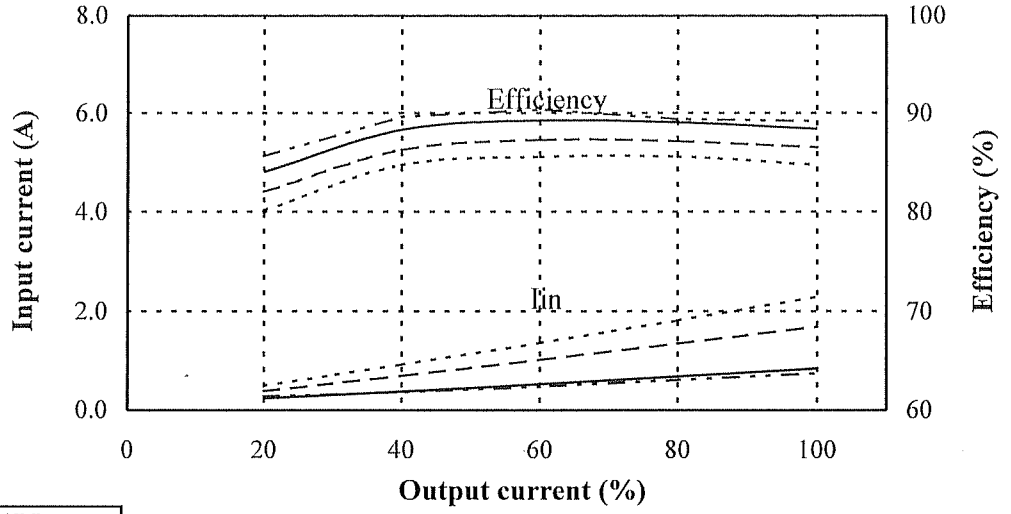


24V

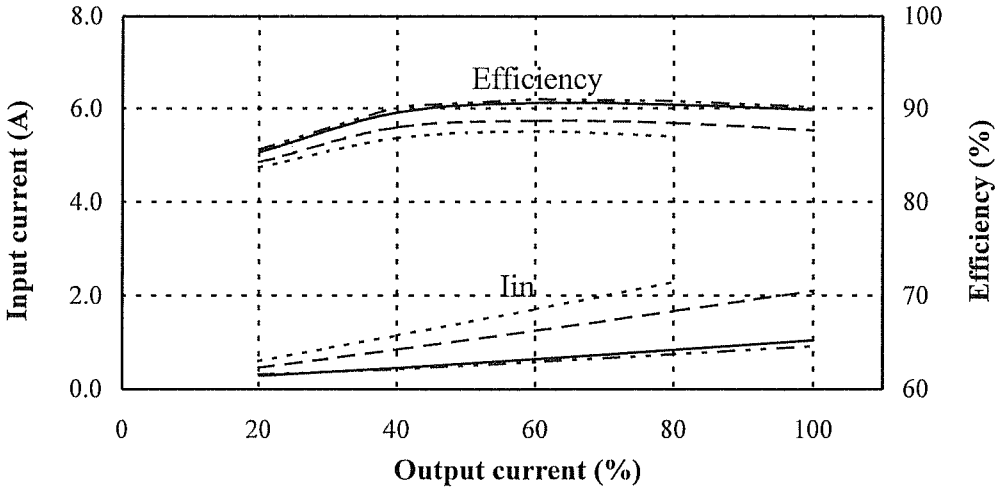


(3) Efficiency and input current vs. output current Conditions: Vin : 85VAC ------
: 115VAC – – – –
: 230VAC ———
: 265VAC –·–·–·–
Ta : 25°C

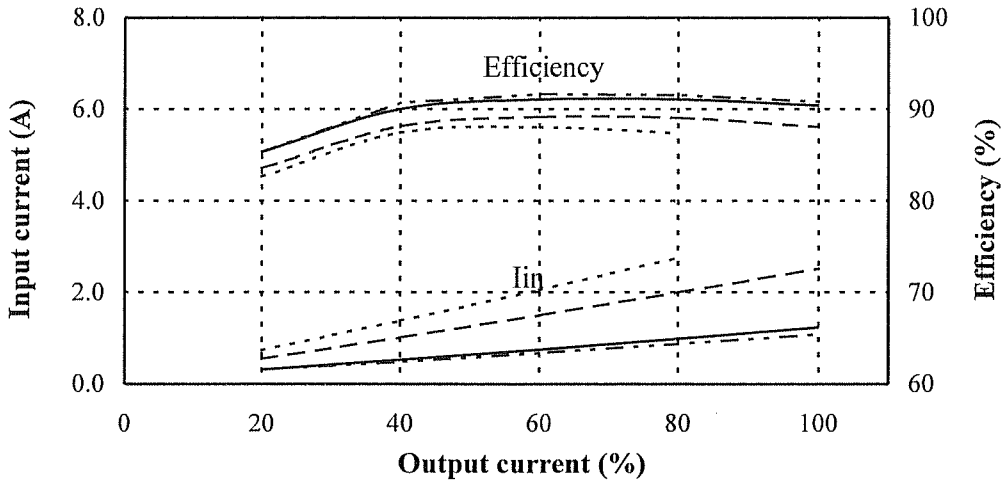
3V



4V



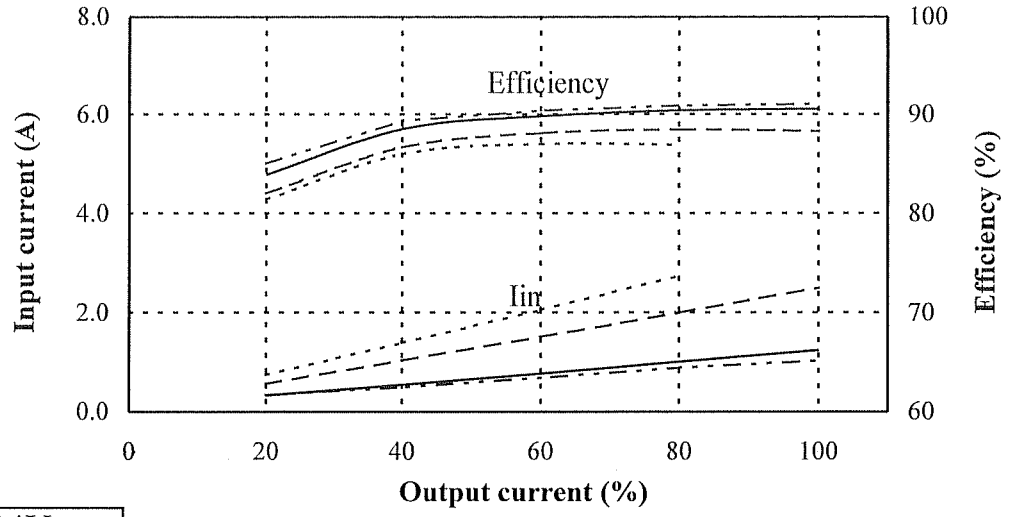
5V



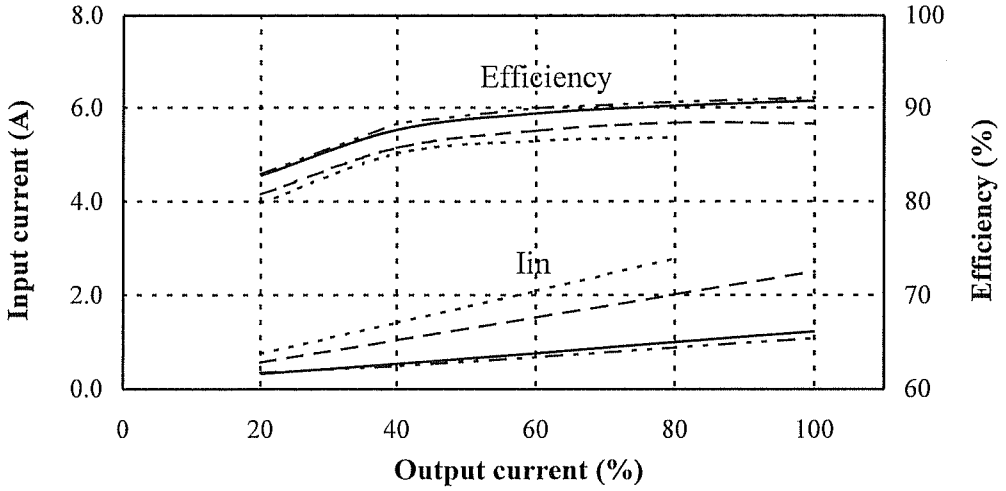
(3) Efficiency and input current vs. output current Conditions: Vin : 85VAC ------
: 115VAC – – – –
: 230VAC ———
: 265VAC –·–·–·–

Ta : 25°C

12V

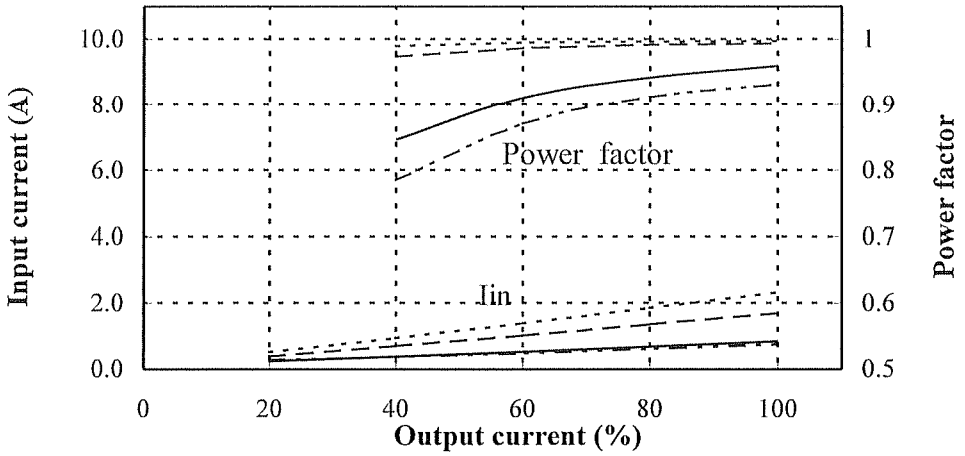


24V

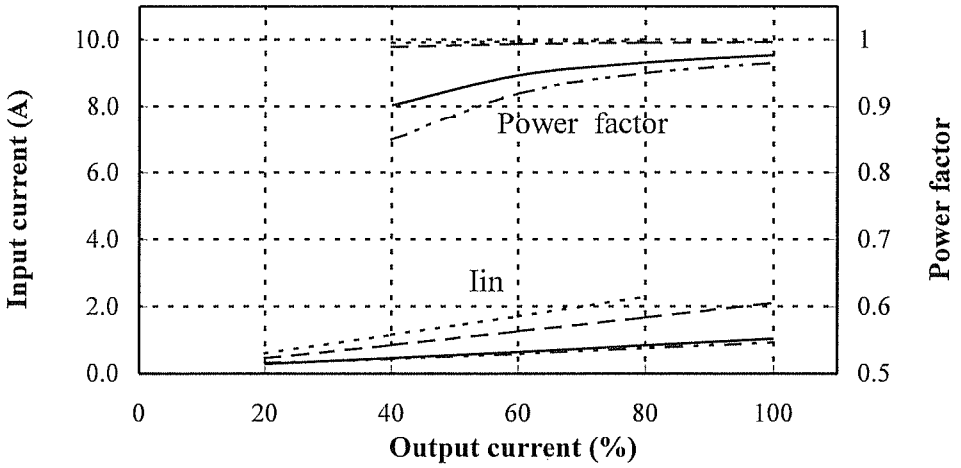


(4) Power factor and input current vs. output current Conditions: Vin : 85VAC ------
: 115VAC – – – –
: 230VAC ———
: 265VAC –·–·–·–
Ta : 25°C

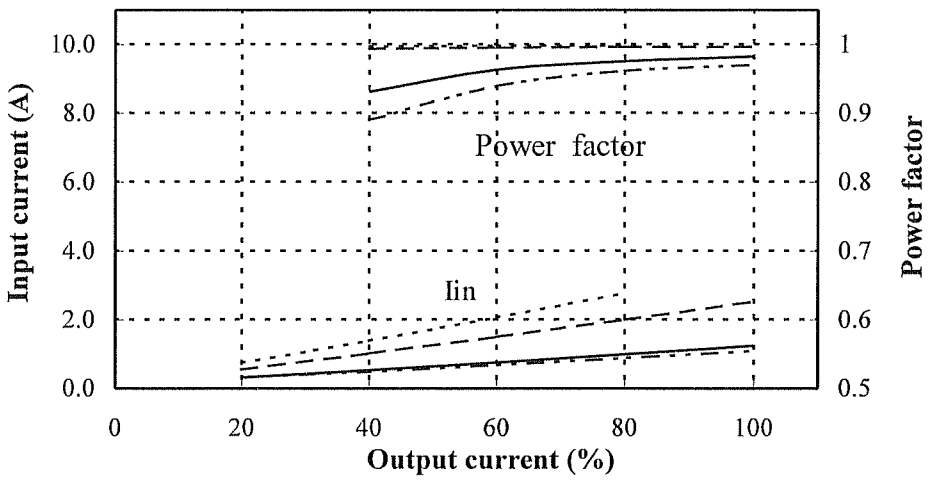
3V



4V

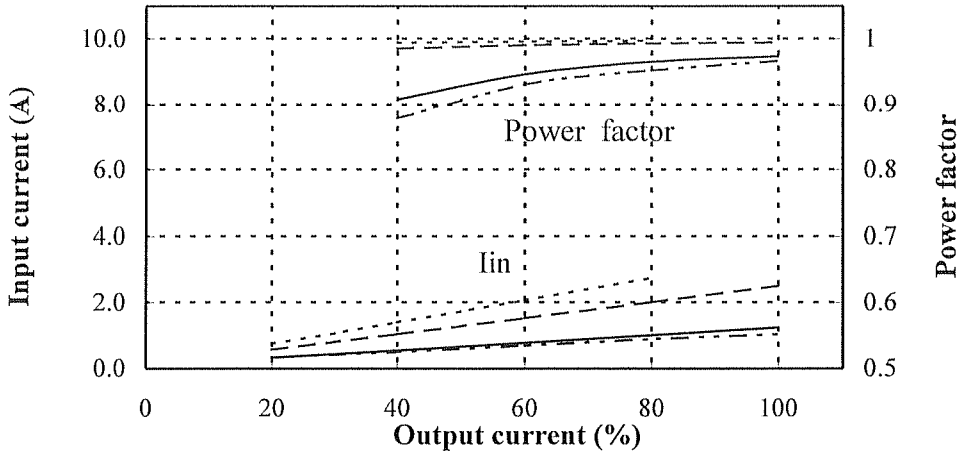


5V

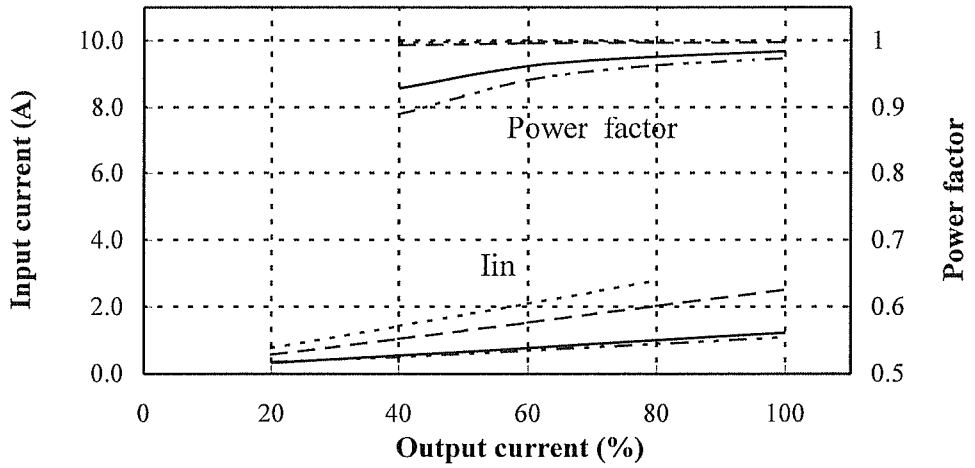


(4) Power factor and input current vs. output current Conditions: Vin : 85VAC ------
: 115VAC – – – –
: 230VAC ———
: 265VAC –·–·–·–
Ta : 25°C

12V



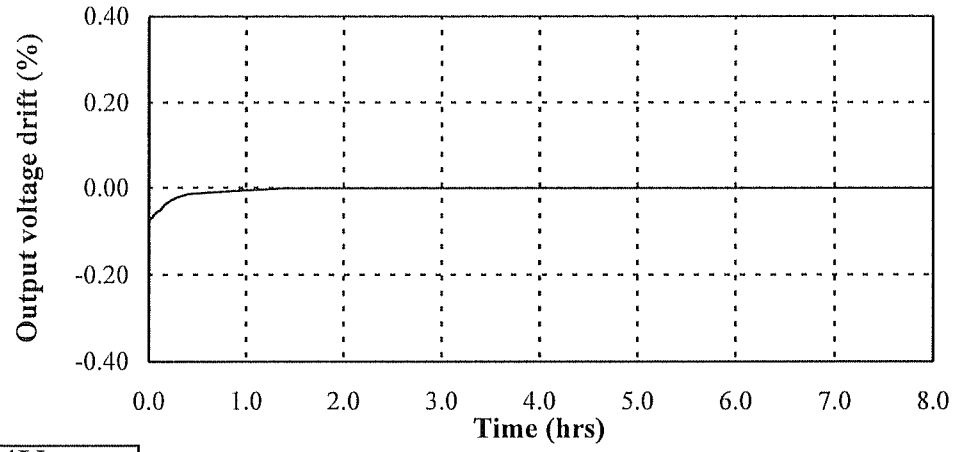
24V



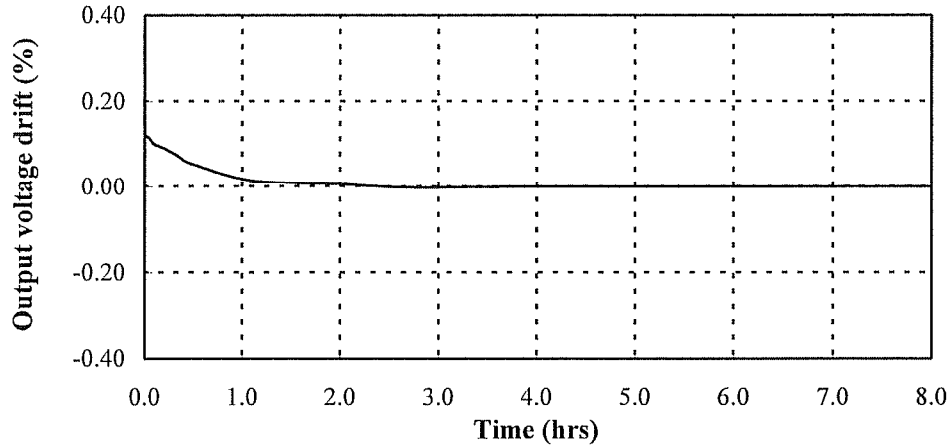
2.2 Warm up voltage drift characteristics

Conditions: Vin : 115VAC
Iout : 100%
Ta : 25°C

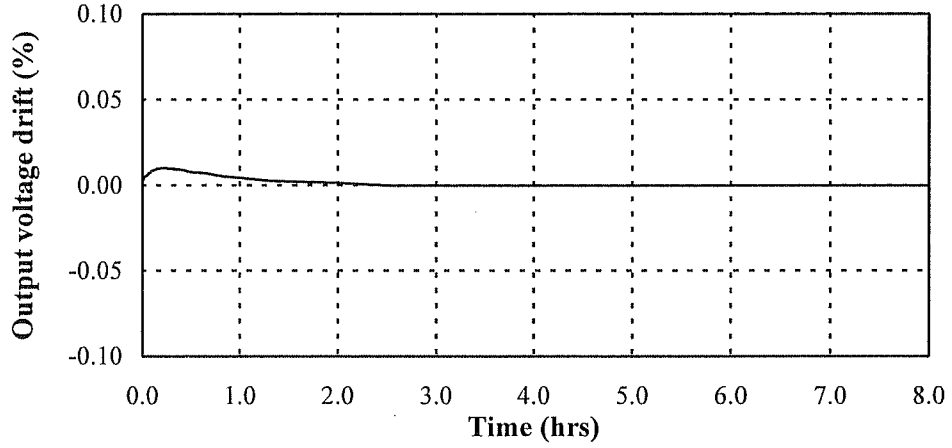
3V



4V



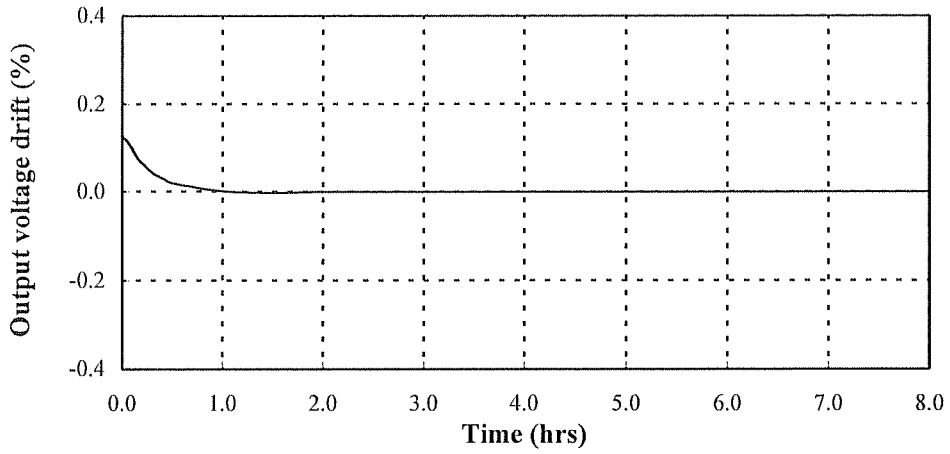
5V



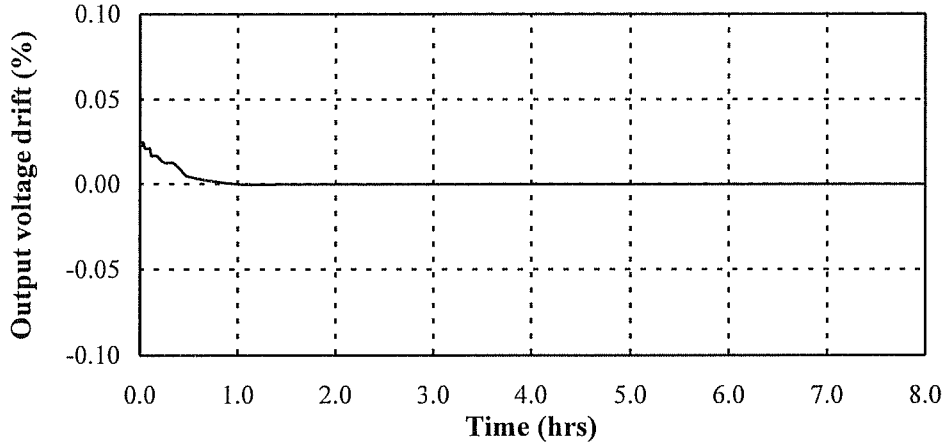
2.2 Warm up voltage drift characteristics

Conditions: Vin : 115VAC
Iout : 100%
Ta : 25°C

12V



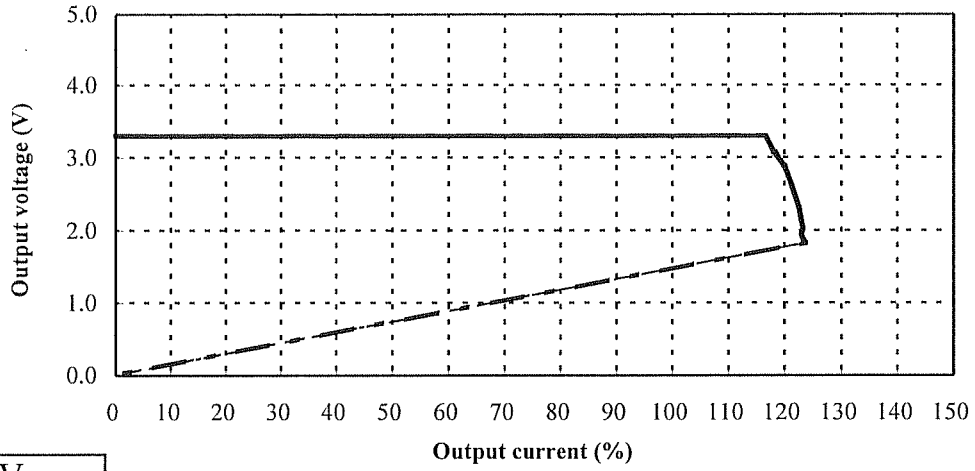
24V



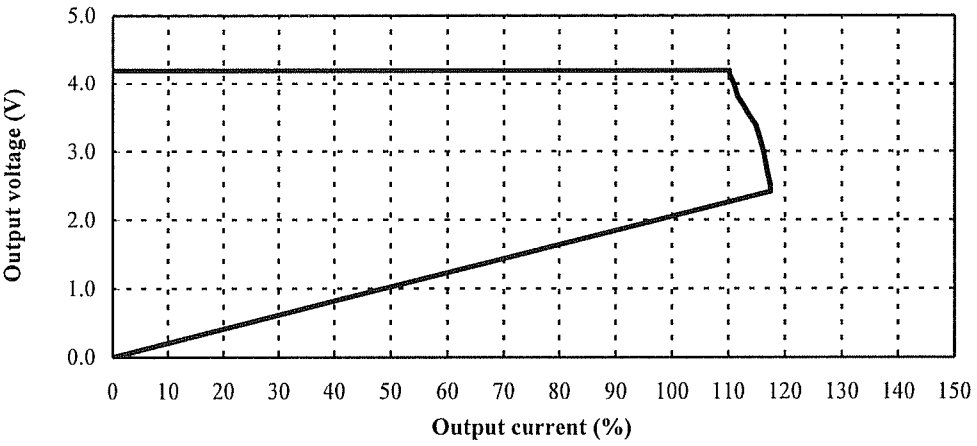
2.3 Over current protection (OCP) characteristics

Conditions: Vin : 85 VAC ----
115 VAC -·-·-·-
230 VAC ——
265 VAC - - - -
Ta : 25℃

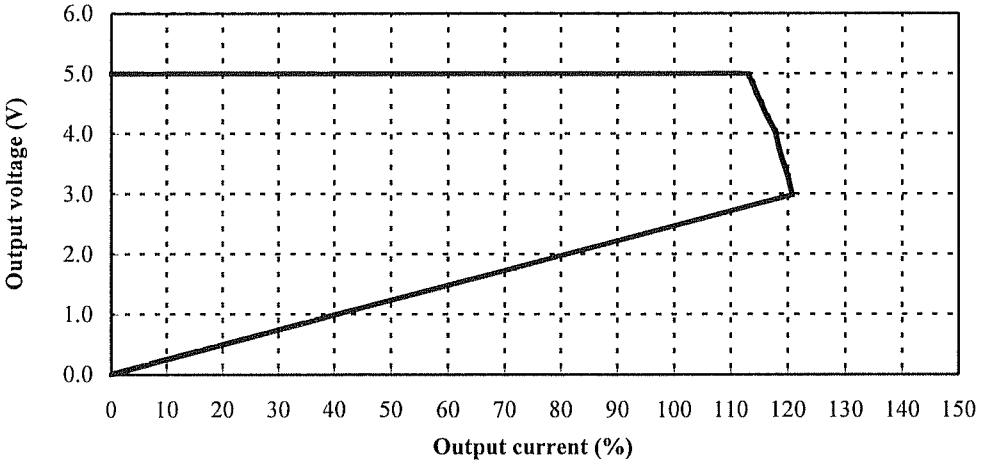
3V



4V



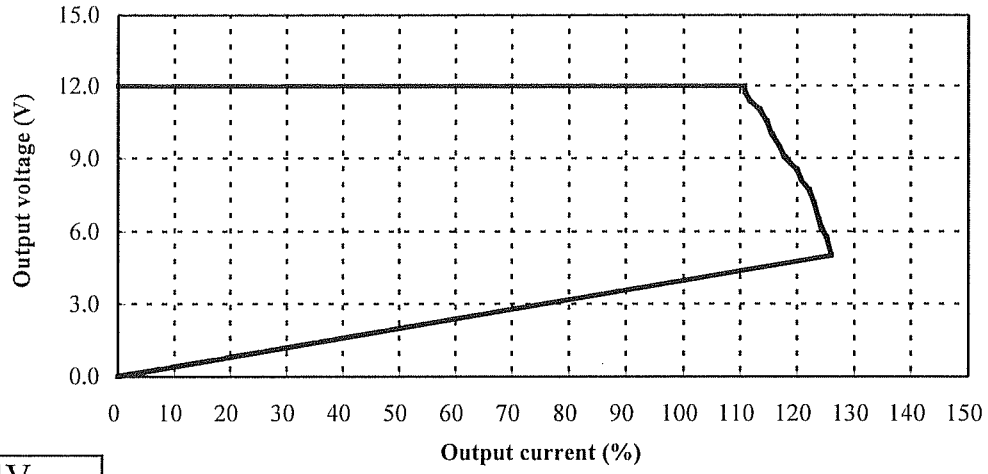
5V



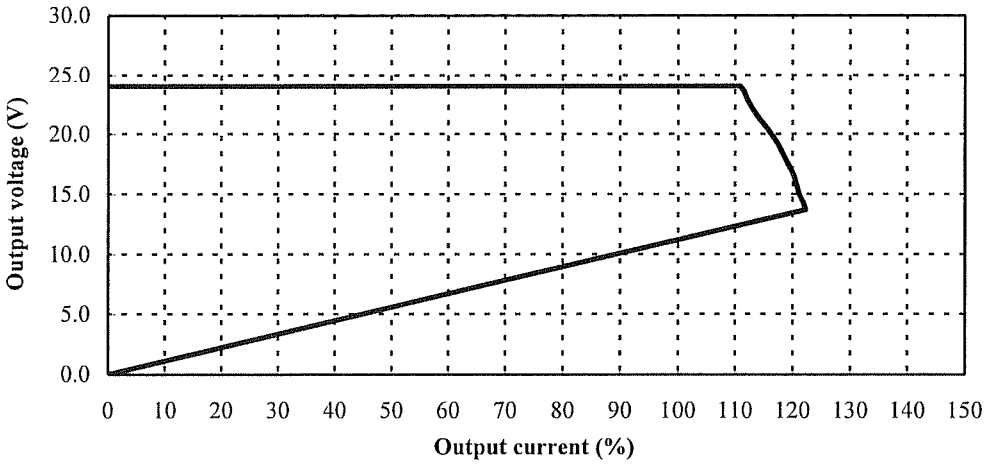
2.3 Over current protection (OCP) characteristics

Conditions: Vin : 85 VAC – – – –
115 VAC - - - - - -
230 VAC ———
265 VAC – – – – – –
Ta : 25℃

12V



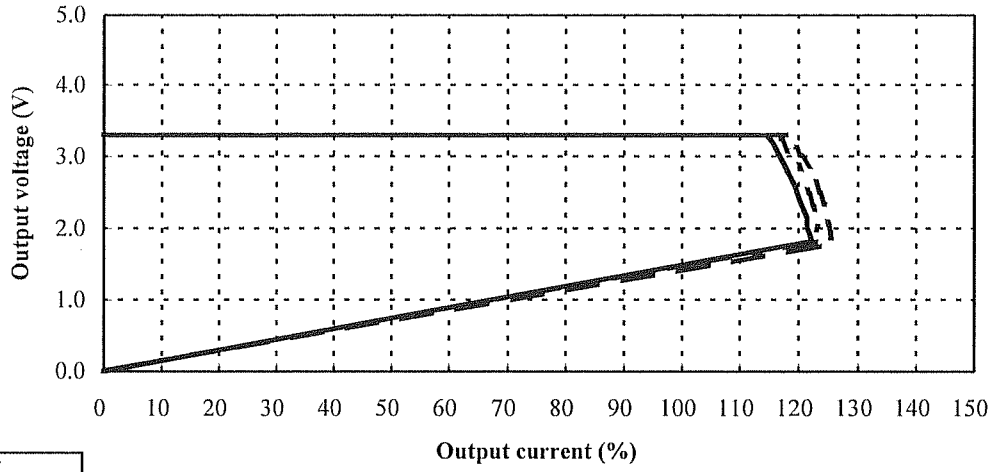
24V



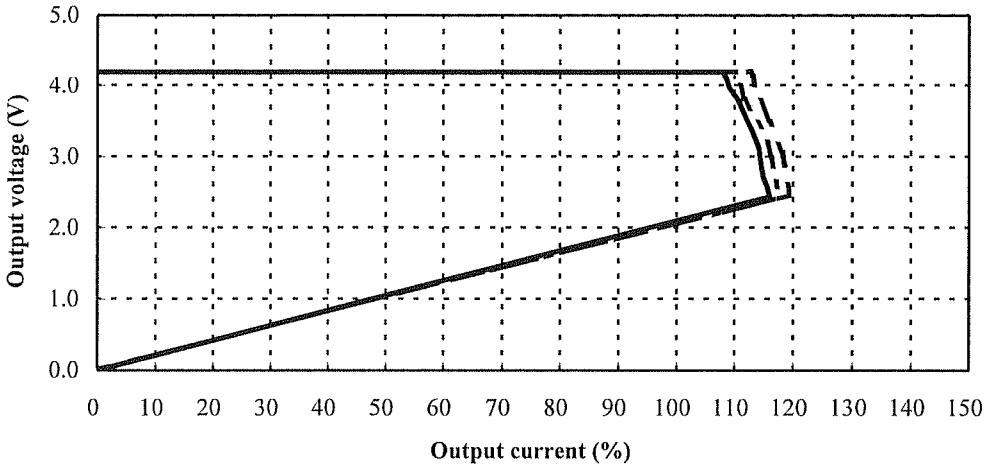
2.3 Over current protection (OCP) characteristics

Conditions: Vin : 115VAC
Ta : -25℃ – – – – –
25℃ - · - · - · -
40℃ ———

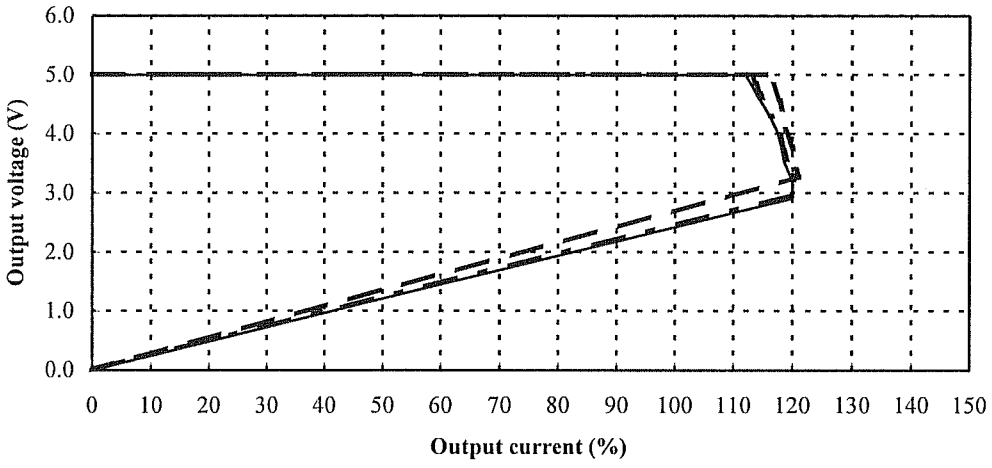
3V



4V



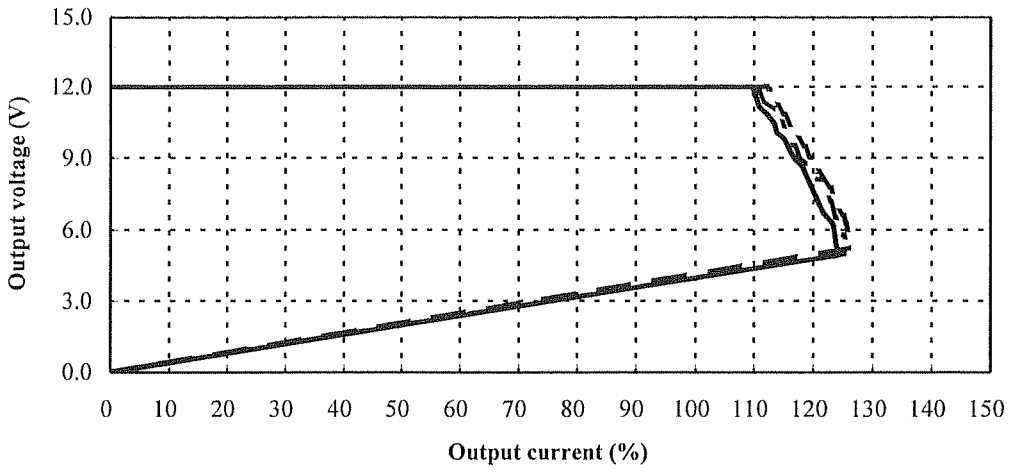
5V



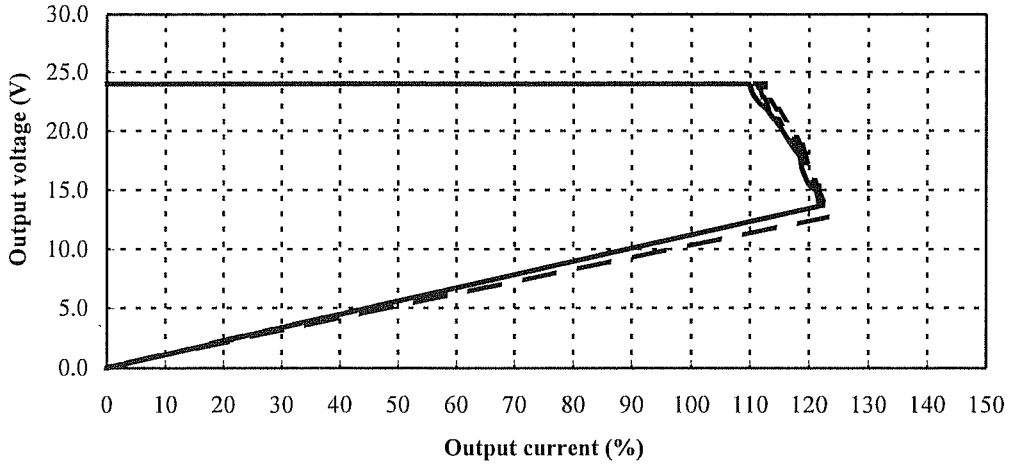
2.3 Over current protection (OCP) characteristics

Conditions: Vin : 115VAC
Ta : -25℃ – – – – –
25℃ - · - · - · -
40℃ ————

12V



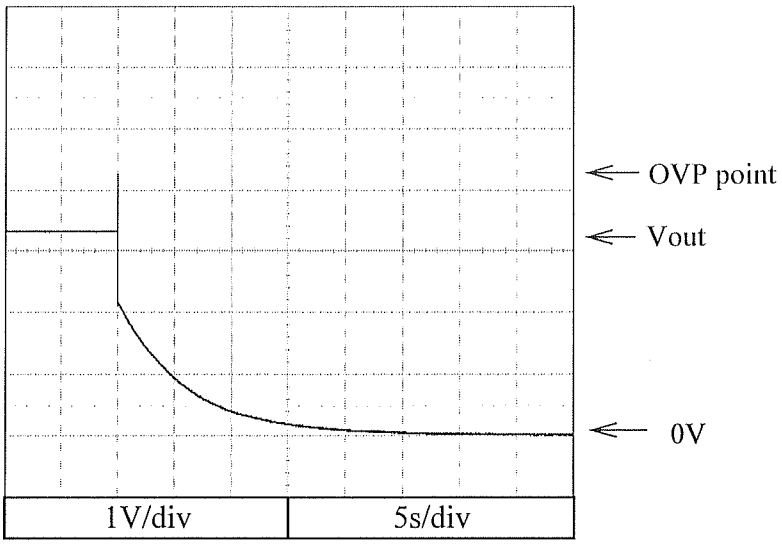
24V



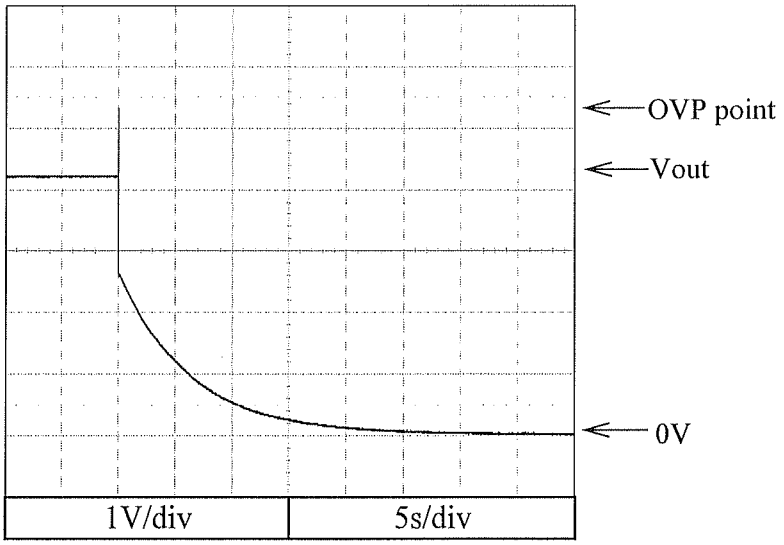
2.4 Over voltage protection (OVP) characteristics

Conditions: Vin : 115VAC
Iout : 0%
Ta : 25°C

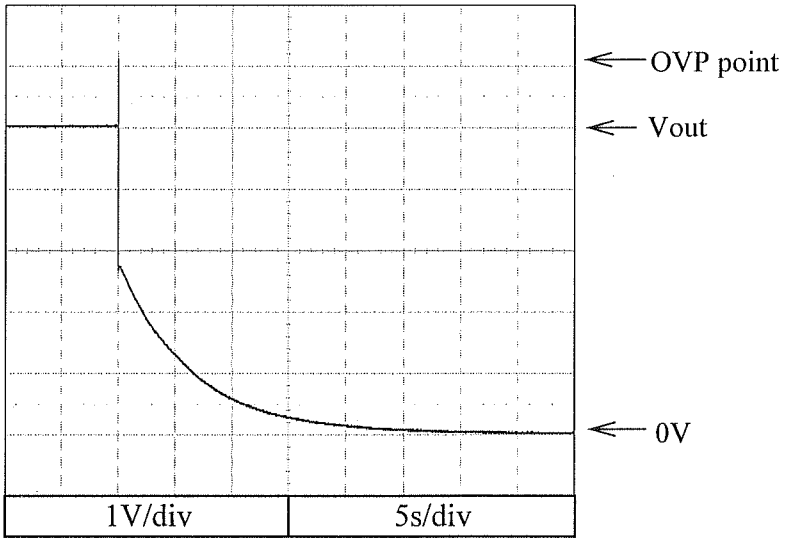
3V



4V



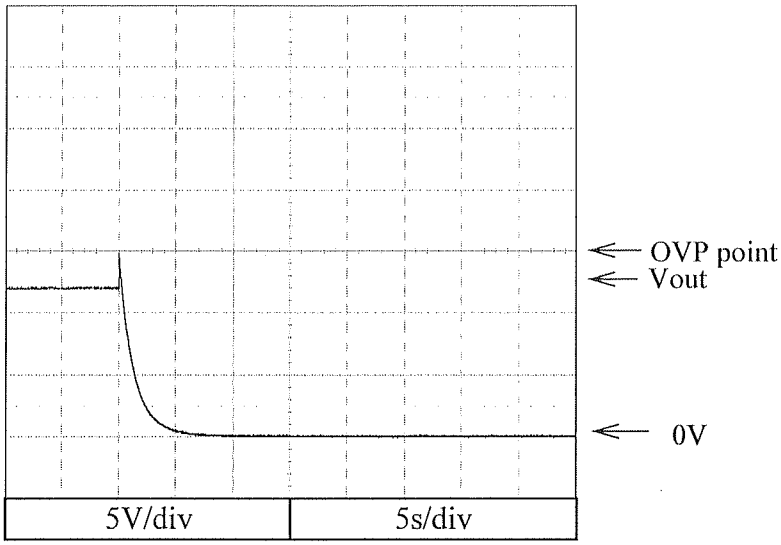
5V



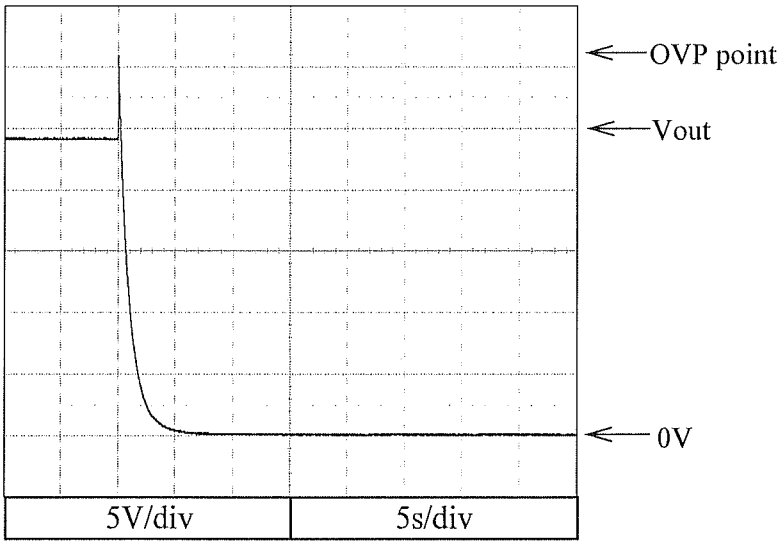
2.4 Over voltage protection (OVP) characteristics

Conditions: Vin : 115VAC
Iout : 0%
Ta : 25°C

12V



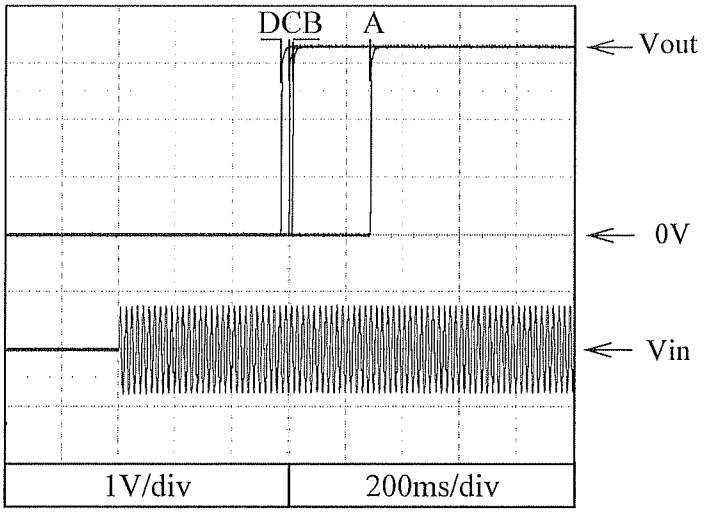
24V



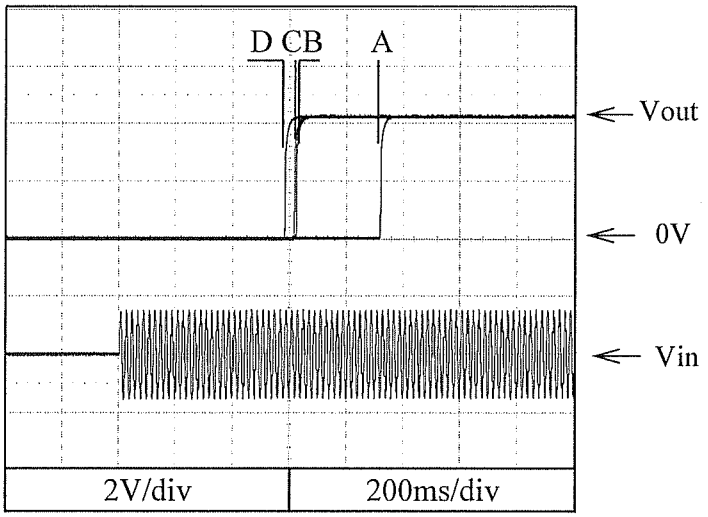
2.5 Output rise characteristics

Conditions: Vin : 85VAC (A)
: 115VAC (B)
: 230VAC (C)
: 265VAC (D)
Iout : 0%
Ta : 25°C

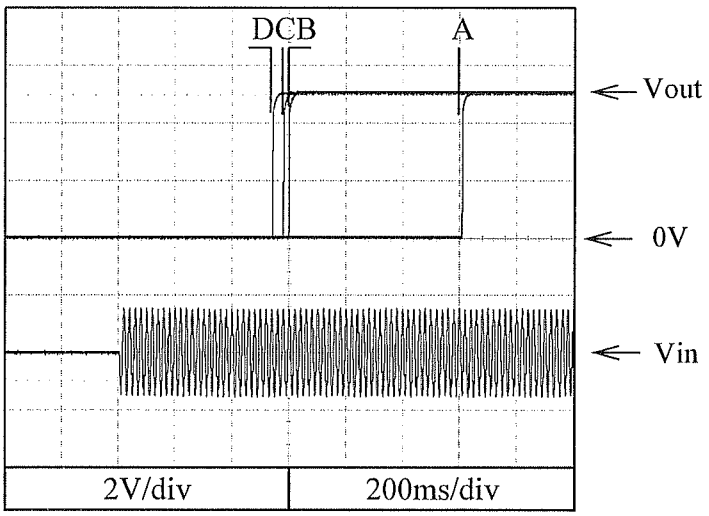
3V



4V



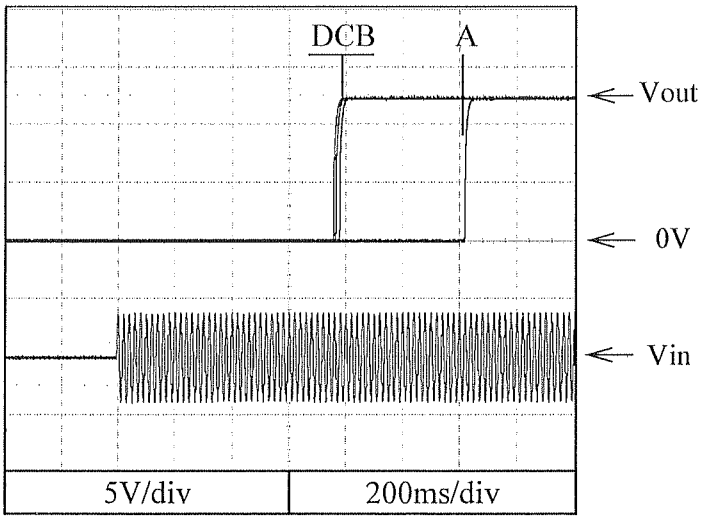
5V



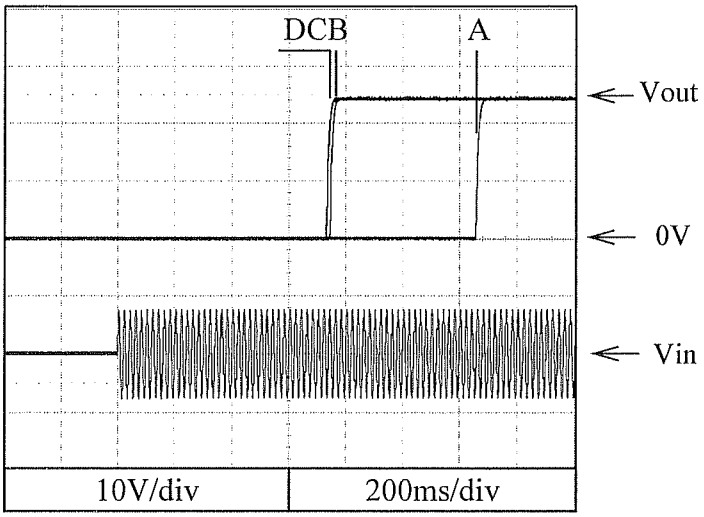
2.5 Output rise characteristics

Conditions: Vin : 85VAC (A)
: 115VAC (B)
: 230VAC (C)
: 265VAC (D)
Iout : 0%
Ta : 25°C

12V



24V

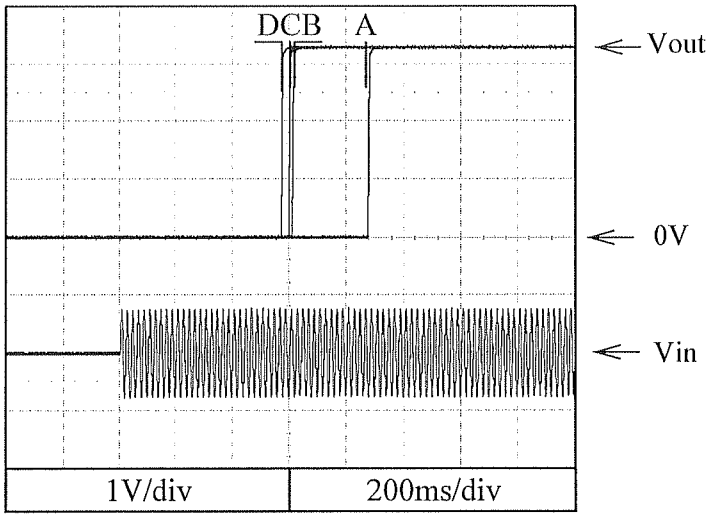


2.5 Output rise characteristics

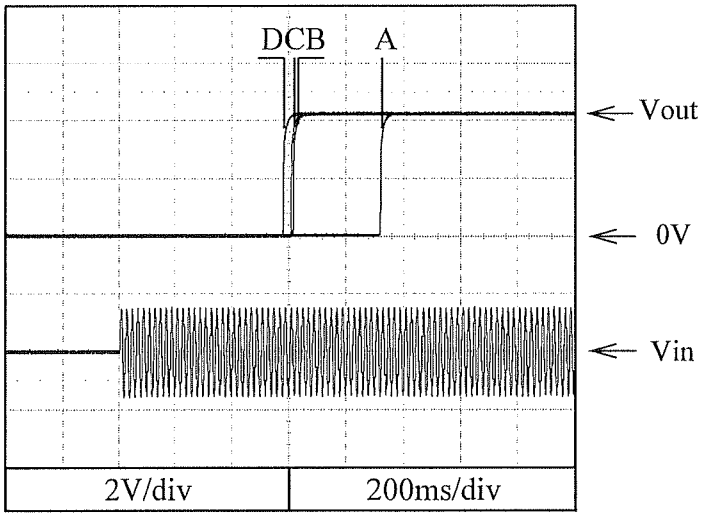
Conditions: Vin
: 85VAC (A)
: 115VAC (B)
: 230VAC (C)
: 265VAC (D)
Ta : 25°C

Iout (4V,5V)
(A): 80%
(B,C,D):100%
Iout (3V)
(A,B,C,D):100%

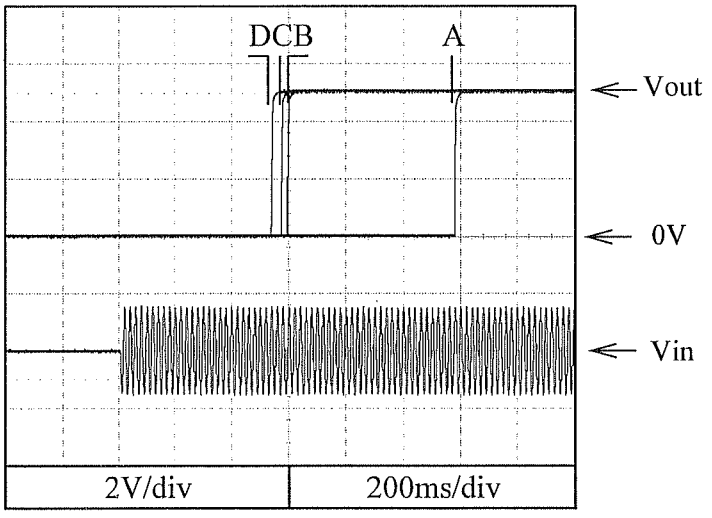
3V



4V



5V

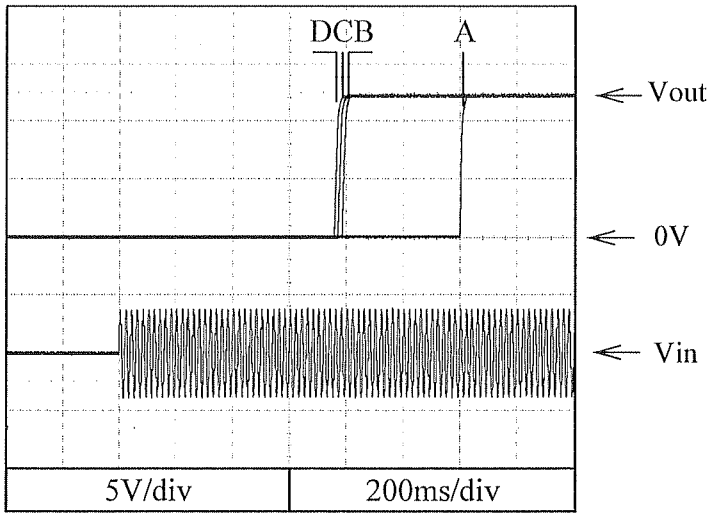


2.5 Output rise characteristics

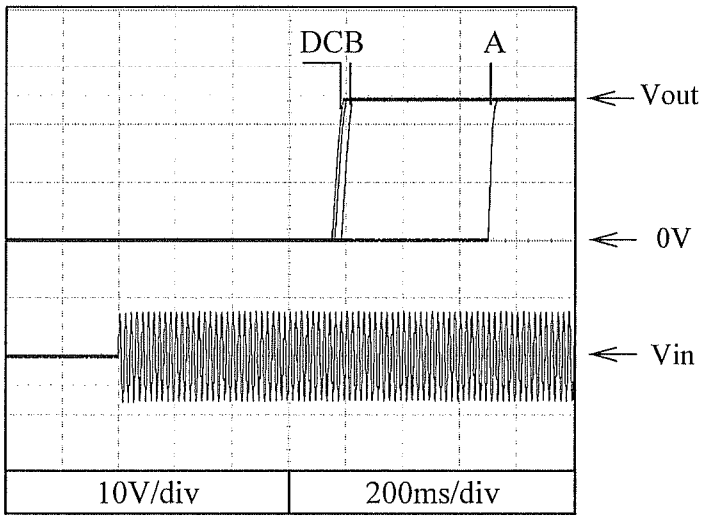
Conditions: Vin : 85VAC (A)
: 115VAC (B)
: 230VAC (C)
: 265VAC (D)
Ta : 25°C

Iout
(A) : 80%
(B,C,D) :100%

12V



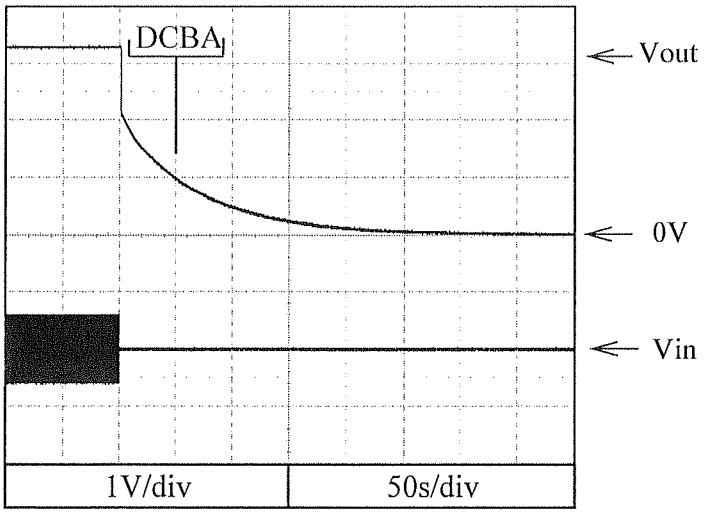
24V



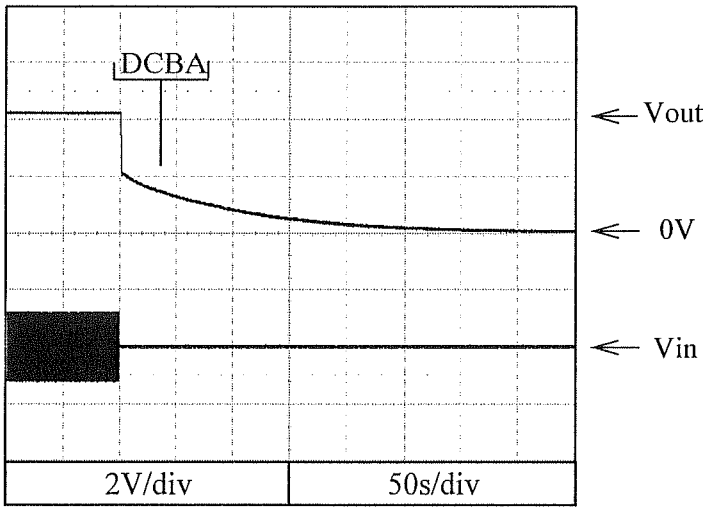
2.6 Output fall characteristics

Conditions: Vin : 85VAC (A)
: 115VAC (B)
: 230VAC (C)
: 265VAC (D)
Iout : 0%
Ta : 25°C

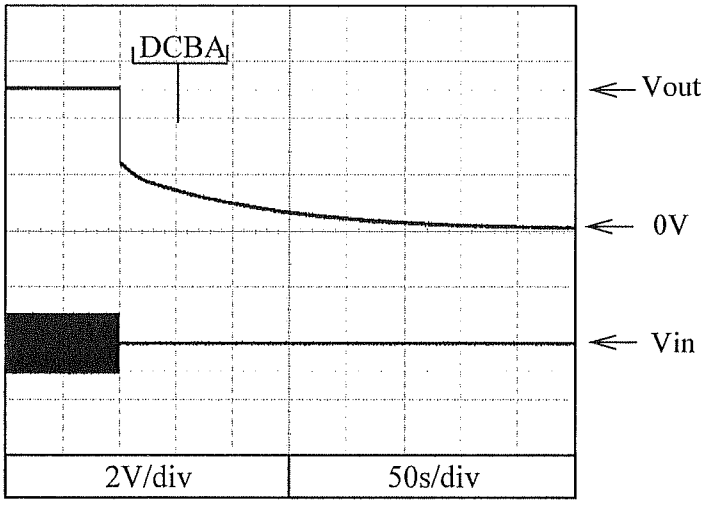
3V



4V



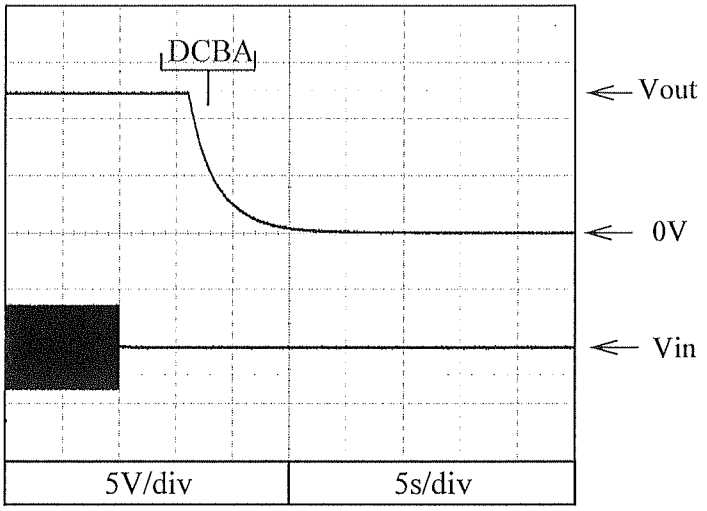
5V



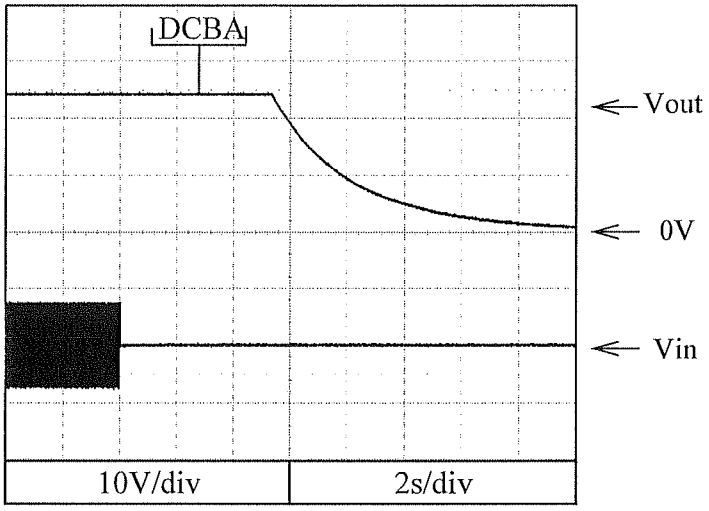
2.6 Output fall characteristics

Conditions: Vin : 85VAC (A)
: 115VAC (B)
: 230VAC (C)
: 265VAC (D)
Iout : 0%
Ta : 25°C

12V



24V

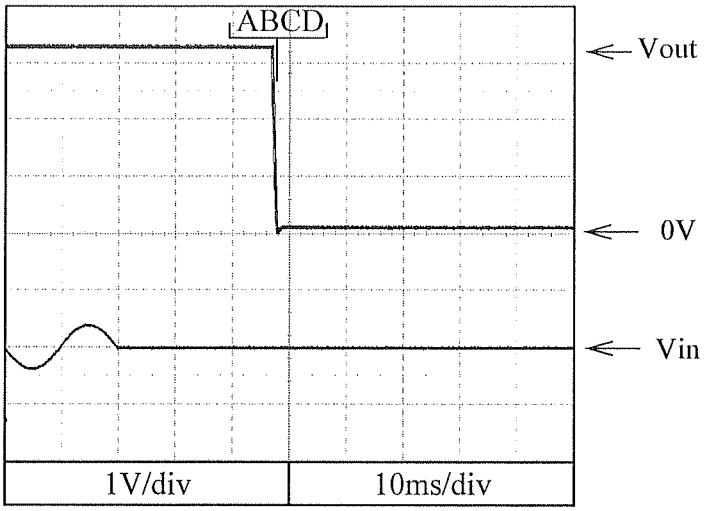


2.6 Output fall characteristics

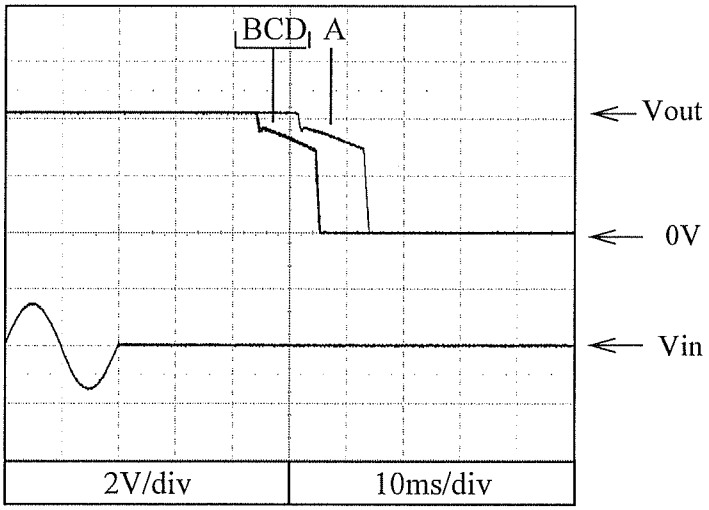
Conditions: Vin
: 85VAC (A)
: 115VAC (B)
: 230VAC (C)
: 265VAC (D)
Ta : 25°C

Iout (4V,5V)
(A): 80%
(B,C,D):100%
Iout (3V)
(A,B,C,D):100%

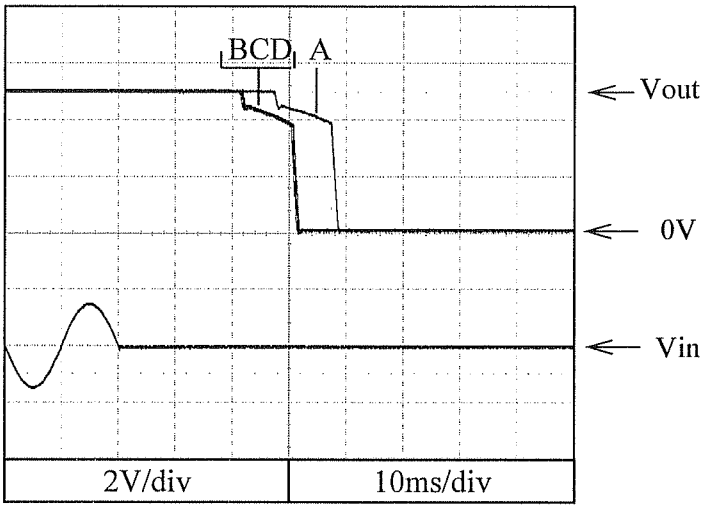
3V



4V



5V

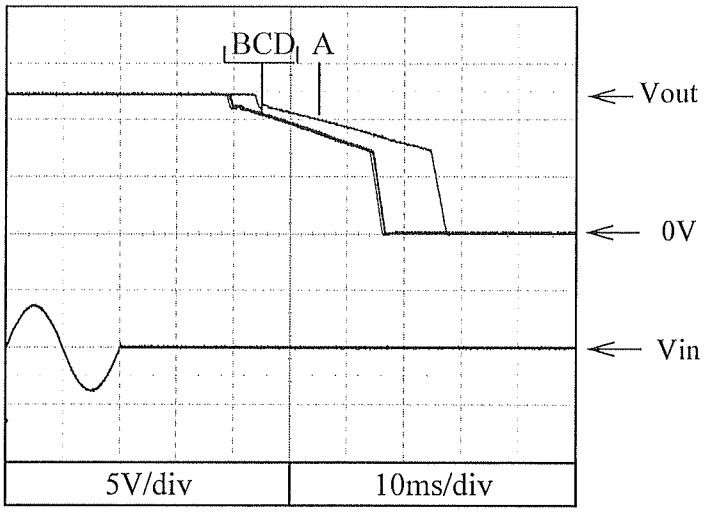


2.6 Output fall characteristics

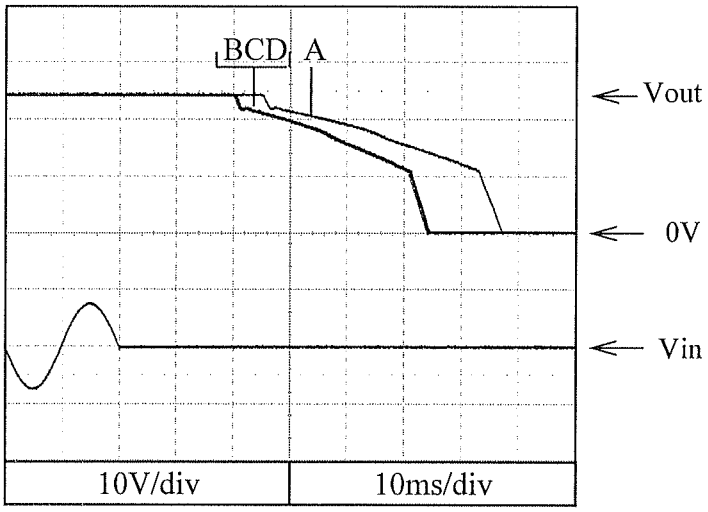
Conditions: Vin : 85VAC (A)
: 115VAC (B)
: 230VAC (C)
: 265VAC (D)
Ta : 25°C

Iout (A): 80%
(B,C,D):100%

12V



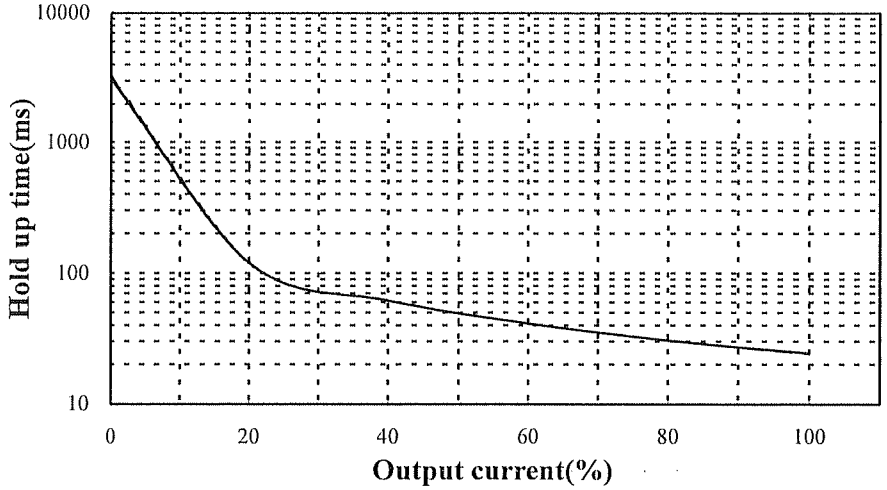
24V



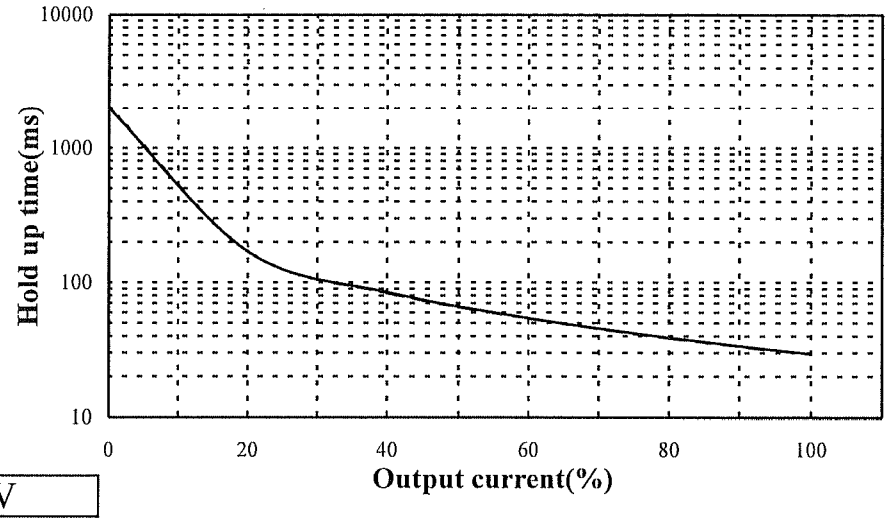
2.7 Hold up time characteristics

Conditions: Vin : 115VAC – – – – –
: 230VAC ———
Ta : 25°C

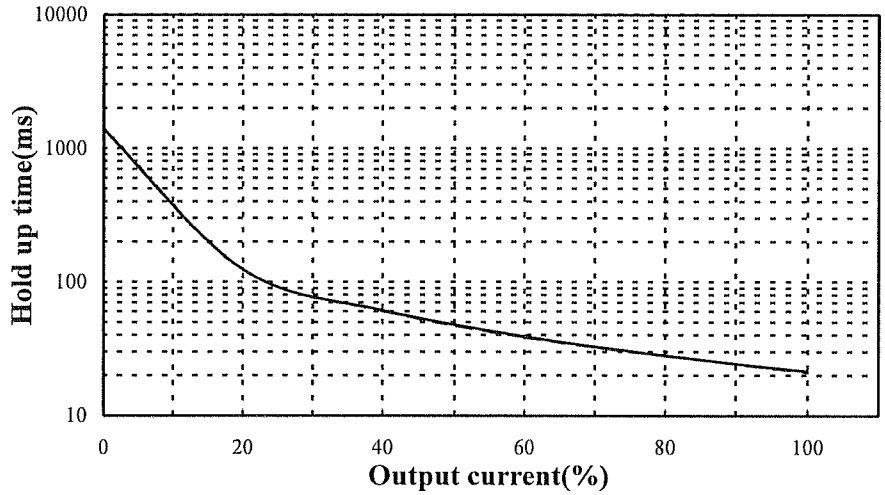
3V



4V



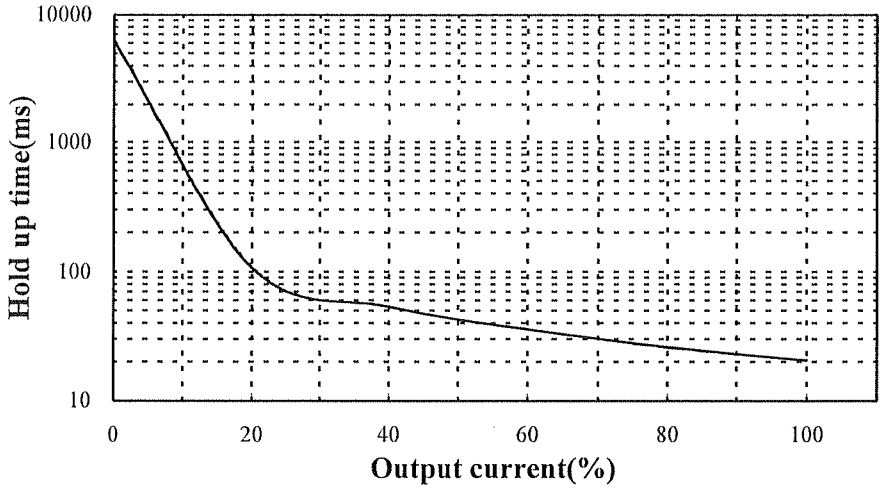
5V



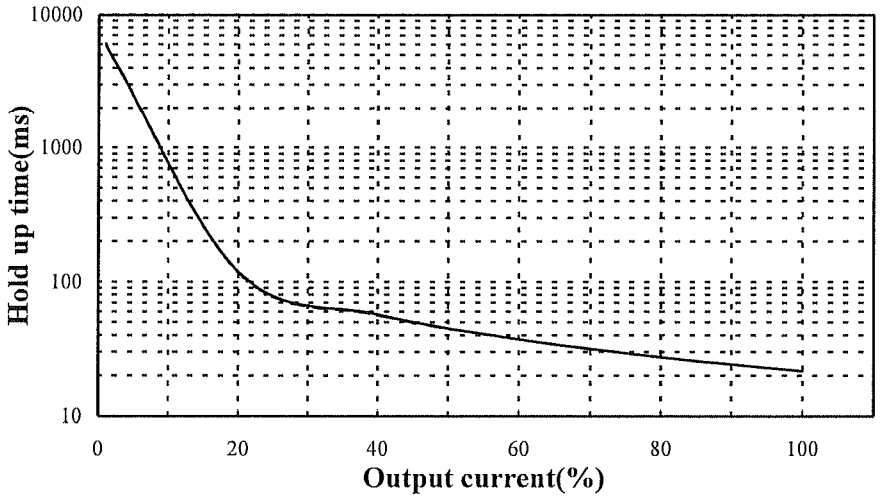
2.7 Hold up time characteristics

Conditions: Vin : 115VAC – – – – –
: 230VAC ———
Ta : 25°C

12V



24V

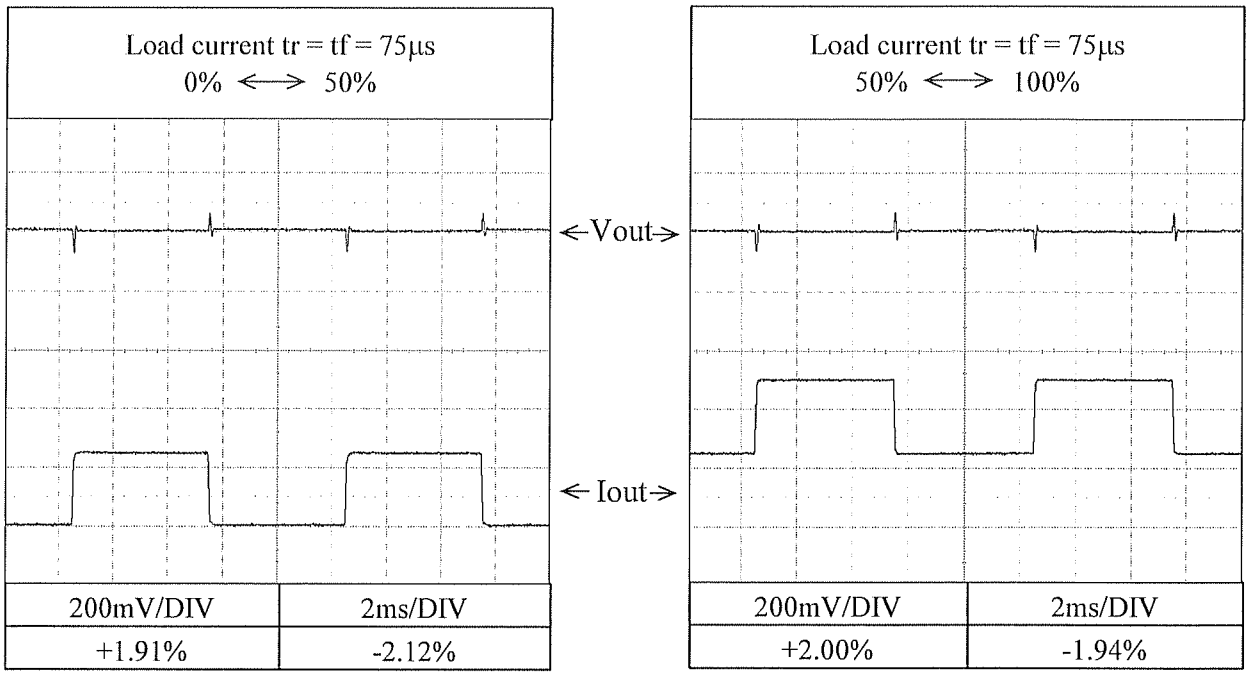


2.8 Dynamic load response characteristics

Conditions: Vin : 115VAC
Ta : 25°C

3V

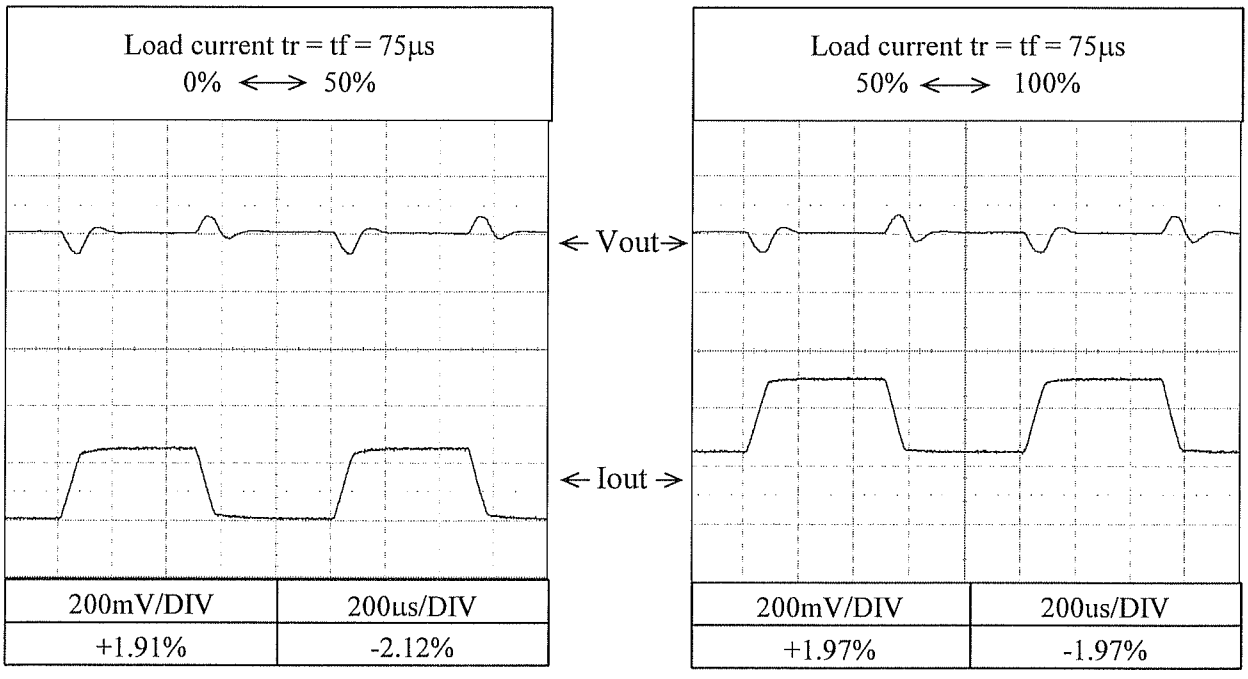
f=100Hz



200mV/DIV	2ms/DIV
+1.91%	-2.12%

200mV/DIV	2ms/DIV
+2.00%	-1.94%

f=1kHz



200mV/DIV	200us/DIV
+1.91%	-2.12%

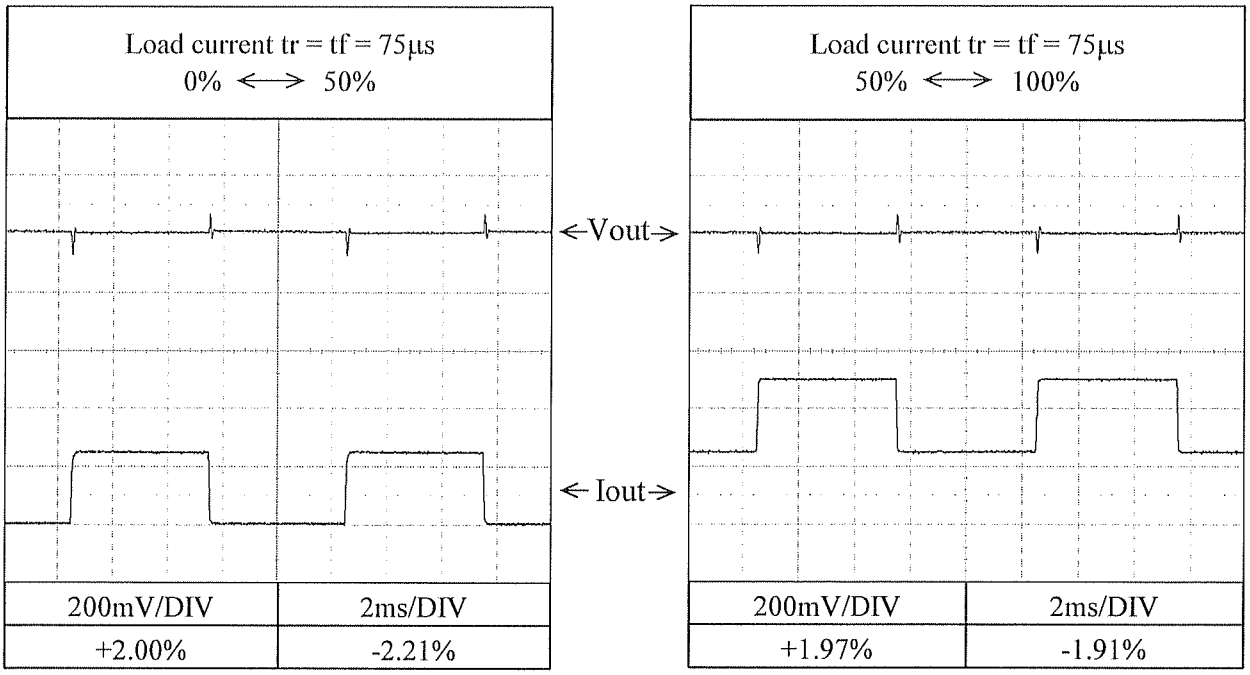
200mV/DIV	200us/DIV
+1.97%	-1.97%

2.8 Dynamic load response characteristics

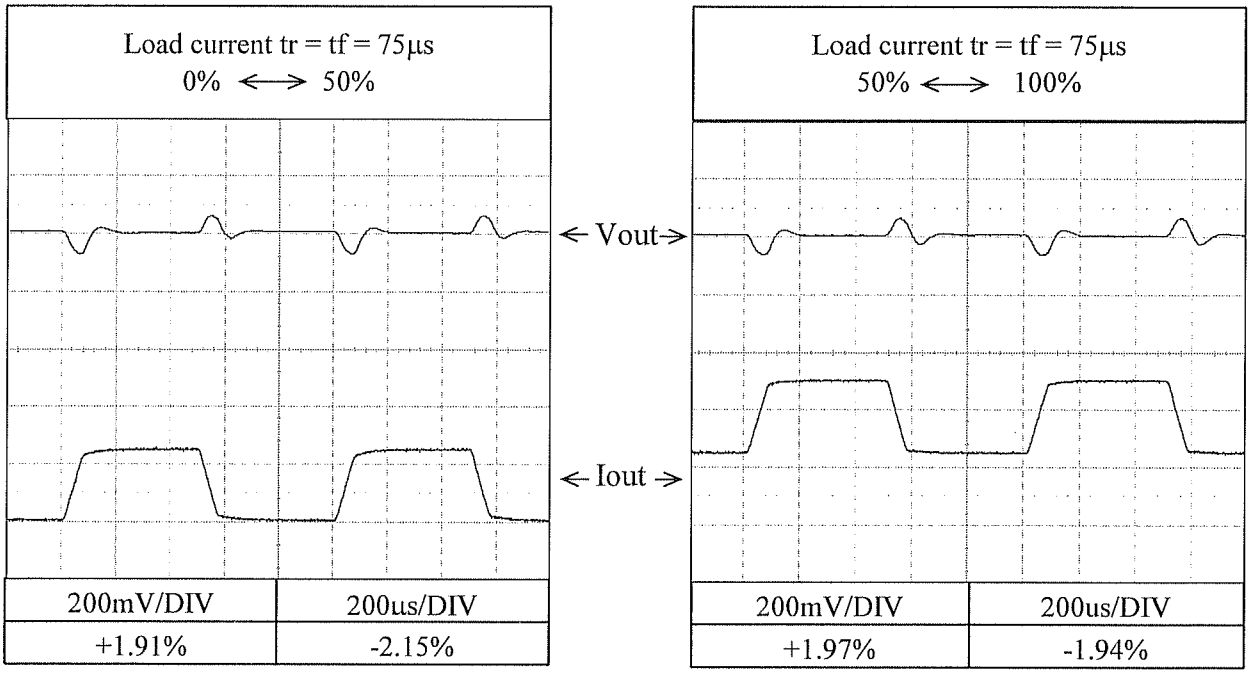
Conditions: Vin : 230VAC
Ta : 25°C

3V

f=100Hz



f=1kHz

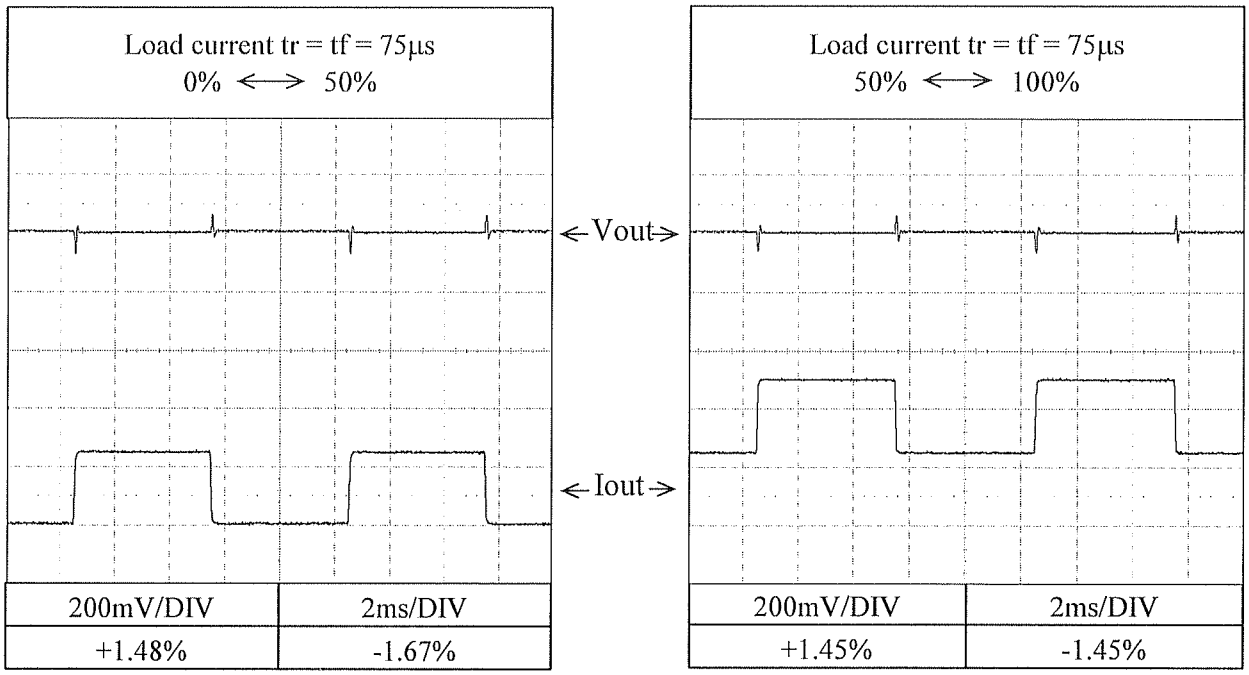


2.8 Dynamic load response characteristics

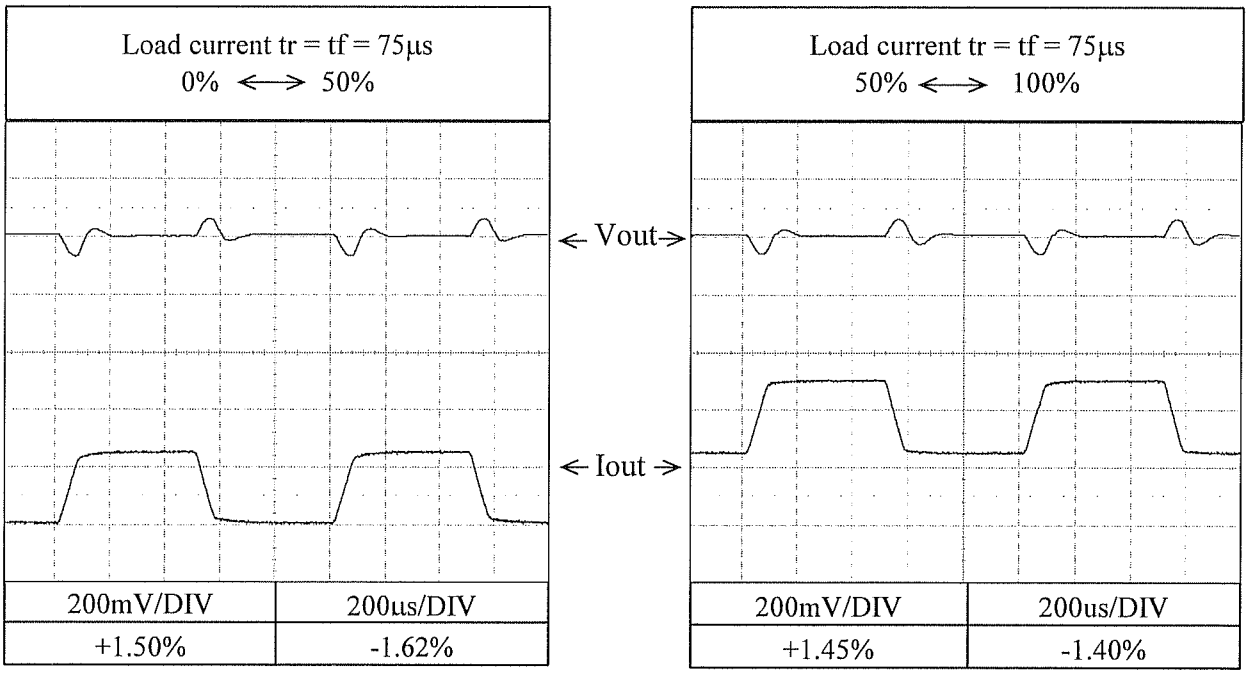
Conditions: Vin : 115VAC
Ta : 25°C

4V

f=100Hz



f=1kHz

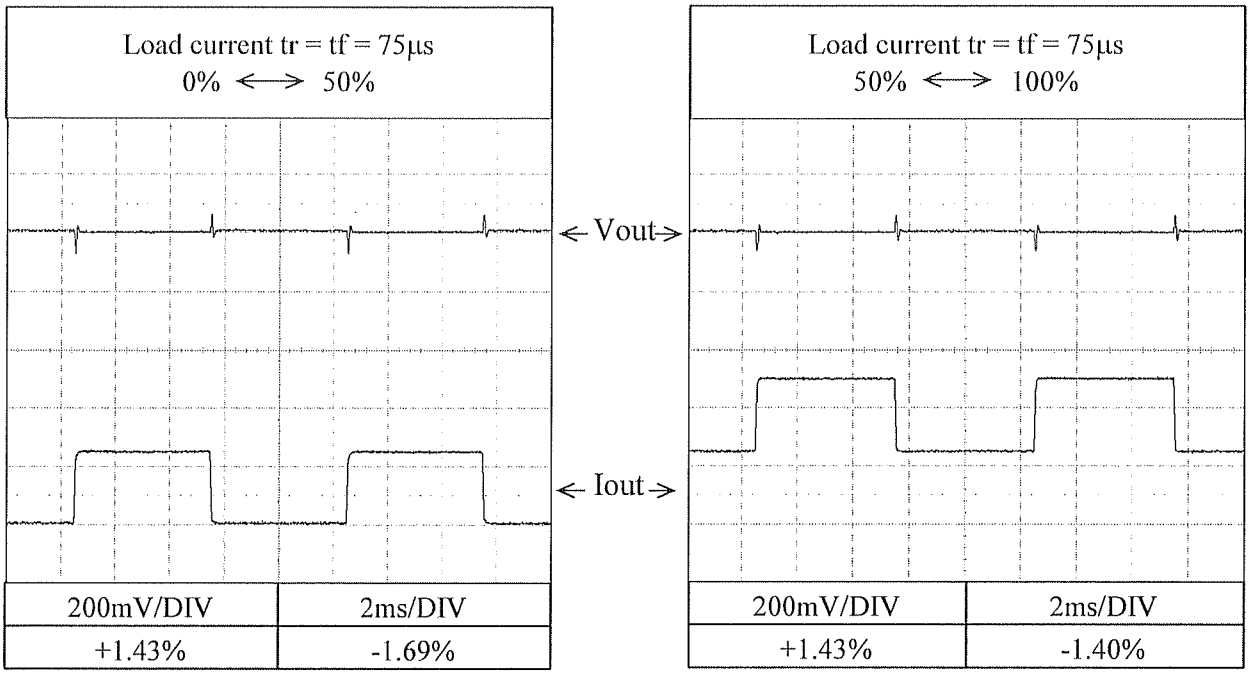


2.8 Dynamic load response characteristics

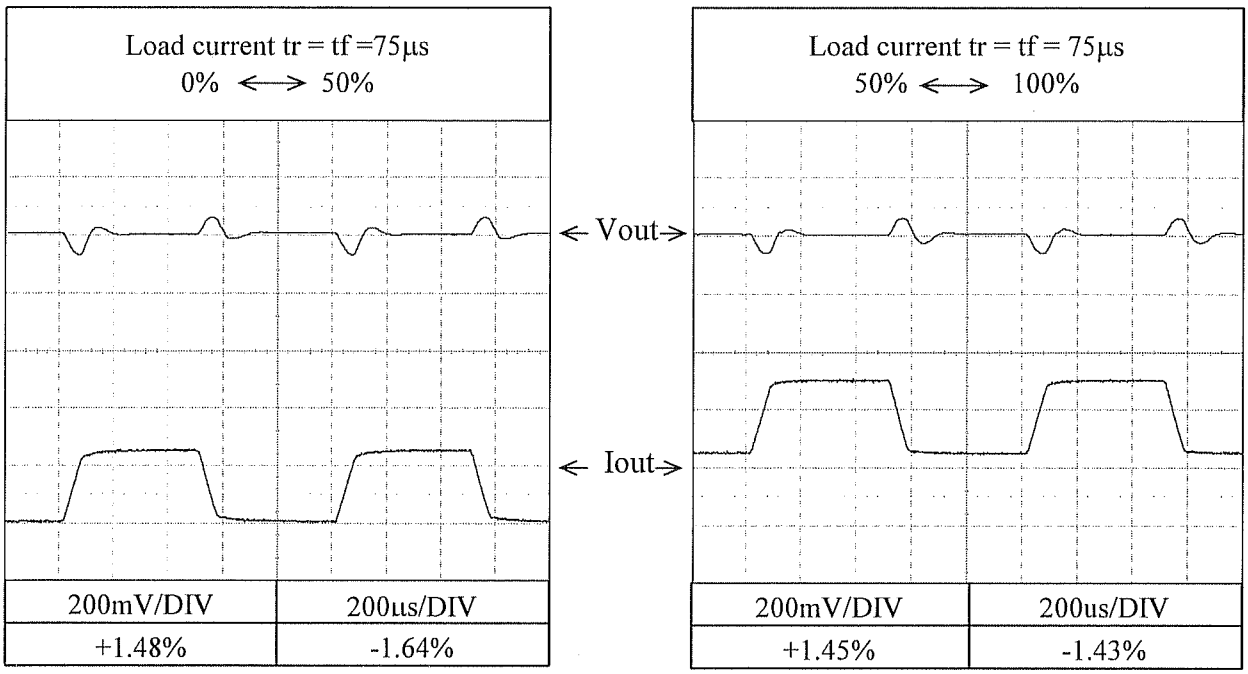
Conditions: Vin : 230VAC
Ta : 25°C

4V

f=100Hz



f=1kHz

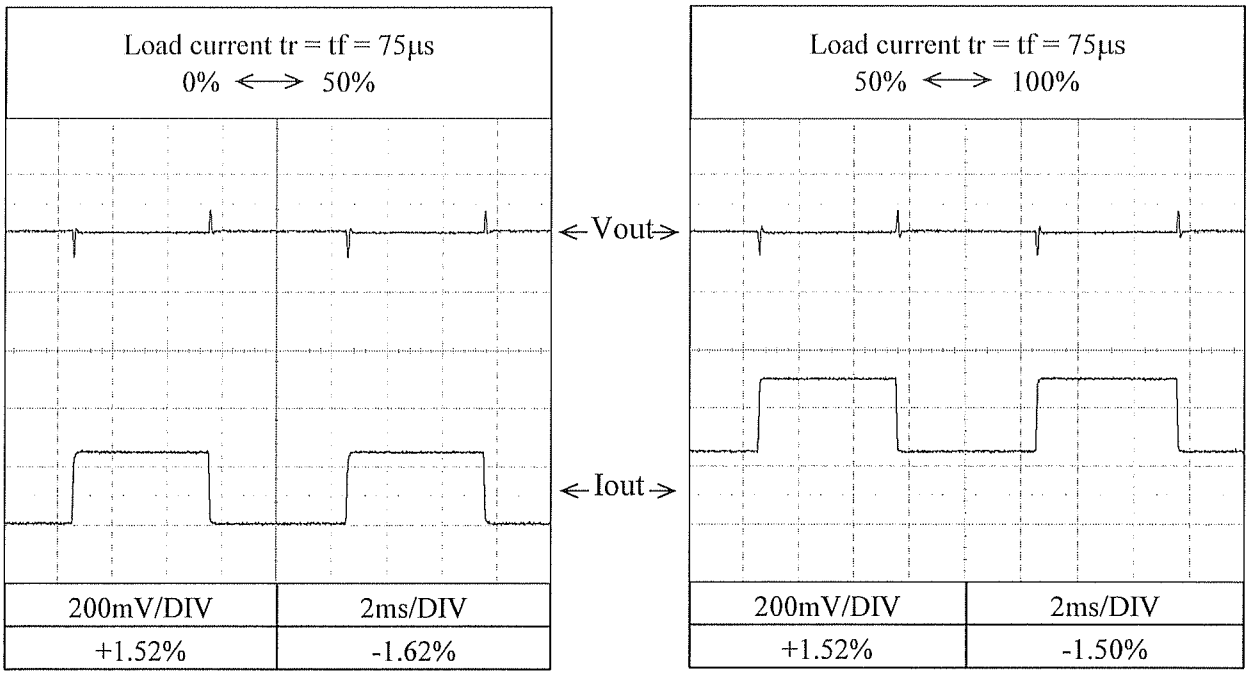


2.8 Dynamic load response characteristics

Conditions: Vin : 115VAC
Ta : 25°C

5V

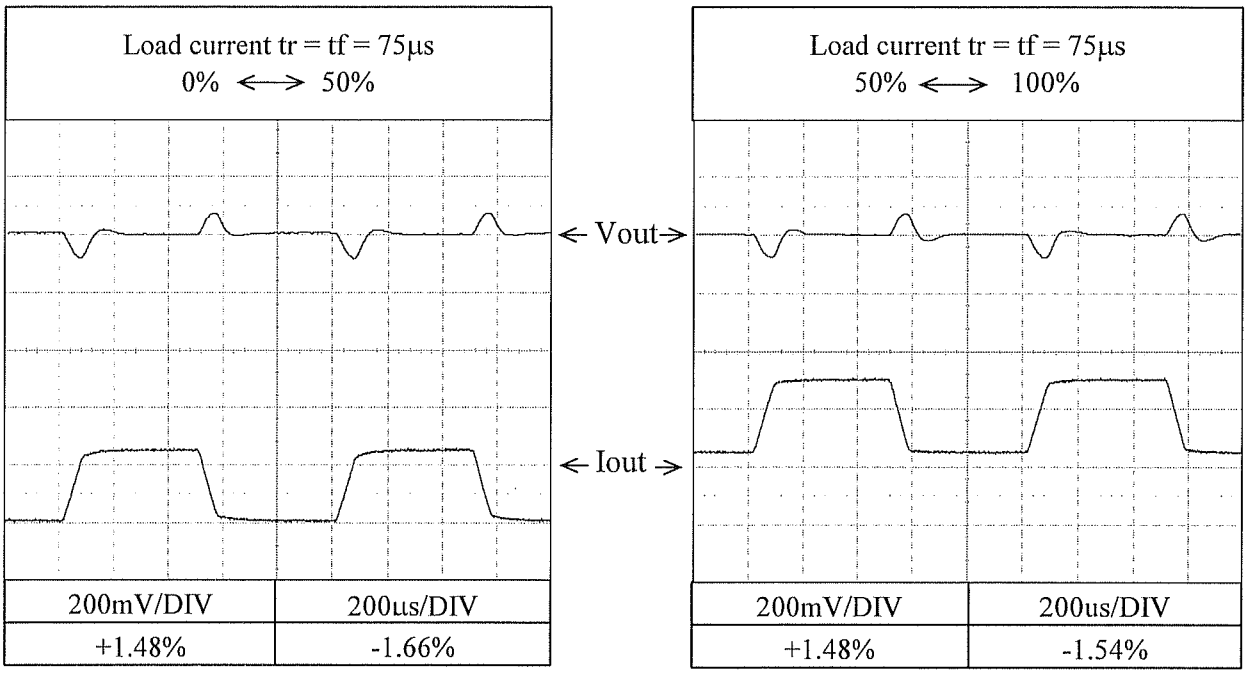
f=100Hz



200mV/DIV	2ms/DIV
+1.52%	-1.62%

200mV/DIV	2ms/DIV
+1.52%	-1.50%

f=1kHz



200mV/DIV	200us/DIV
+1.48%	-1.66%

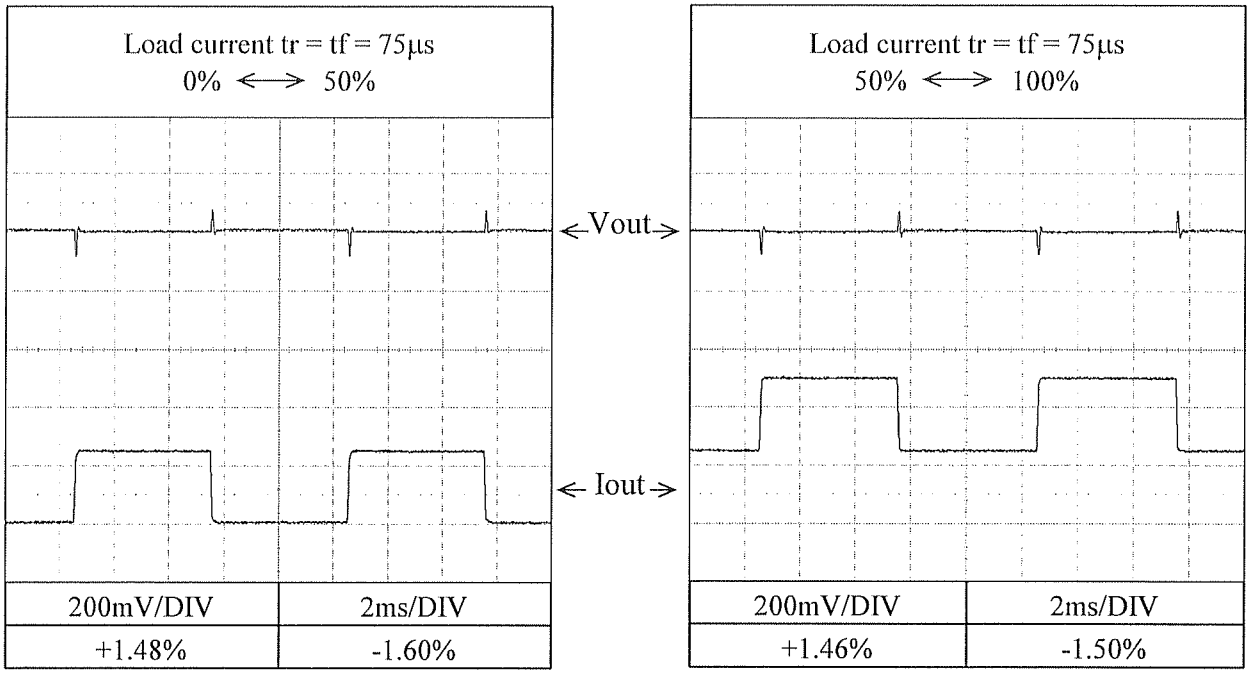
200mV/DIV	200us/DIV
+1.48%	-1.54%

2.8 Dynamic load response characteristics

Conditions: Vin : 230VAC
Ta : 25°C

5V

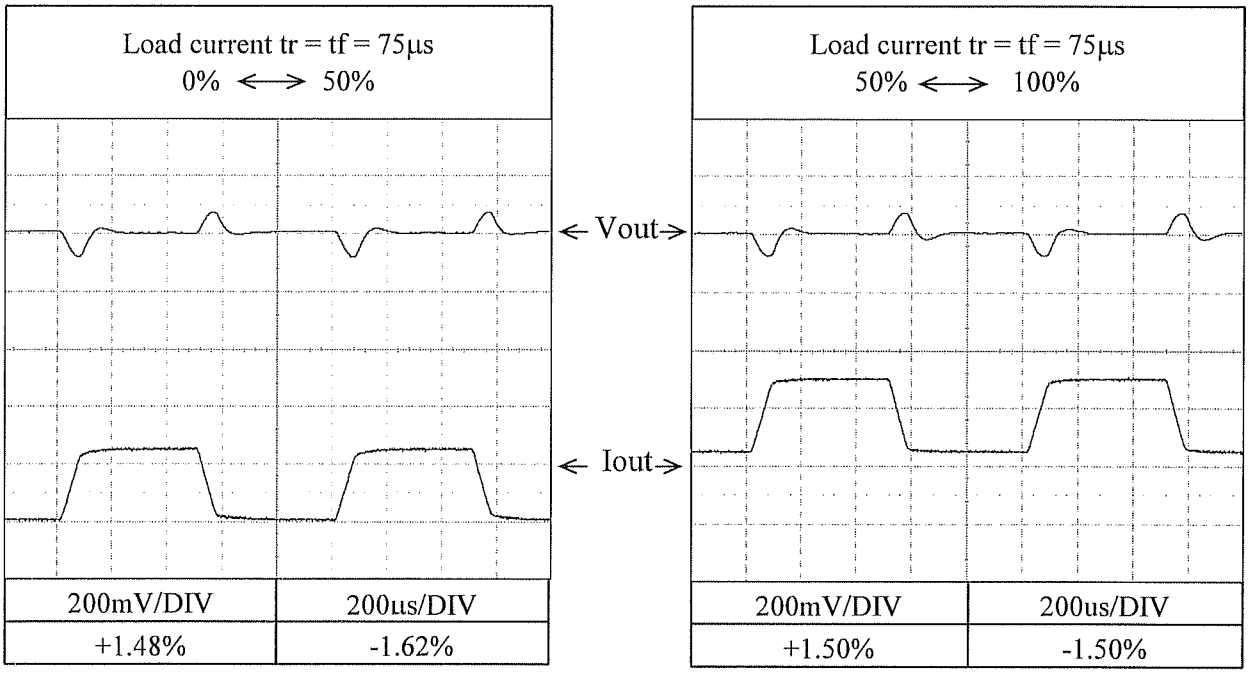
f=100Hz



200mV/DIV	2ms/DIV
+1.48%	-1.60%

200mV/DIV	2ms/DIV
+1.46%	-1.50%

f=1kHz



200mV/DIV	200us/DIV
+1.48%	-1.62%

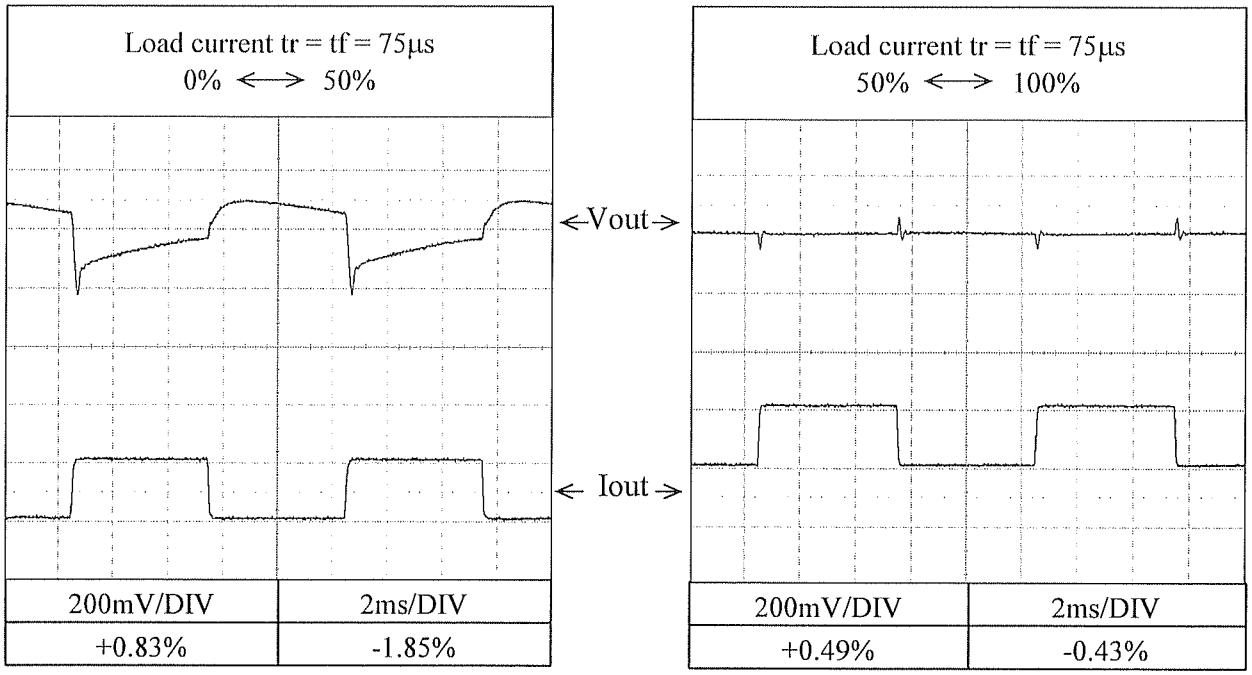
200mV/DIV	200us/DIV
+1.50%	-1.50%

2.8 Dynamic load response characteristics

Conditions: Vin : 115VAC
Ta : 25°C

12V

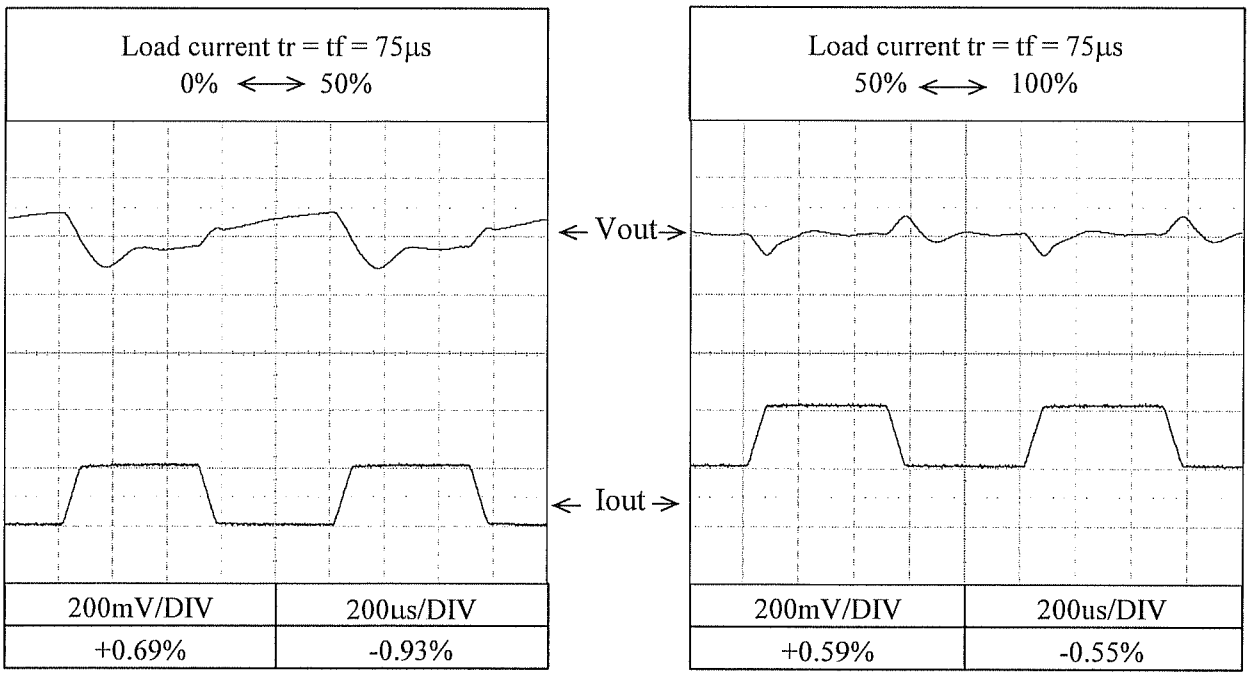
f=100Hz



200mV/DIV	2ms/DIV
+0.83%	-1.85%

200mV/DIV	2ms/DIV
+0.49%	-0.43%

f=1kHz



200mV/DIV	200us/DIV
+0.69%	-0.93%

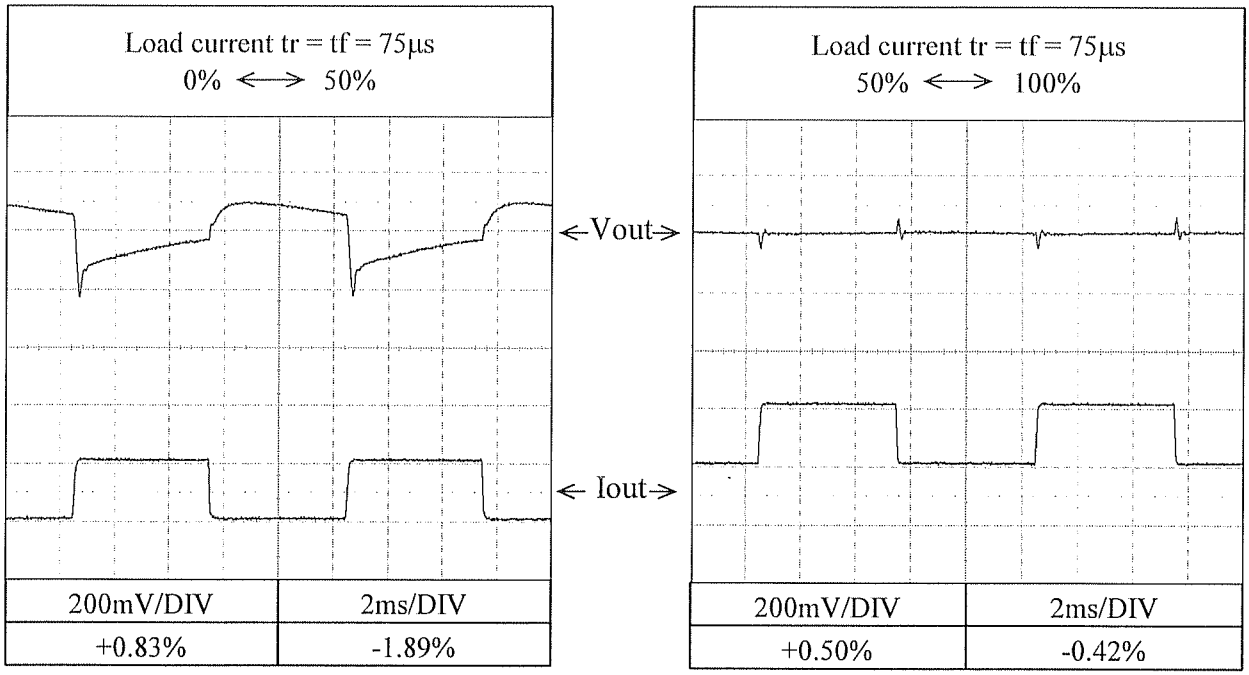
200mV/DIV	200us/DIV
+0.59%	-0.55%

2.8 Dynamic load response characteristics

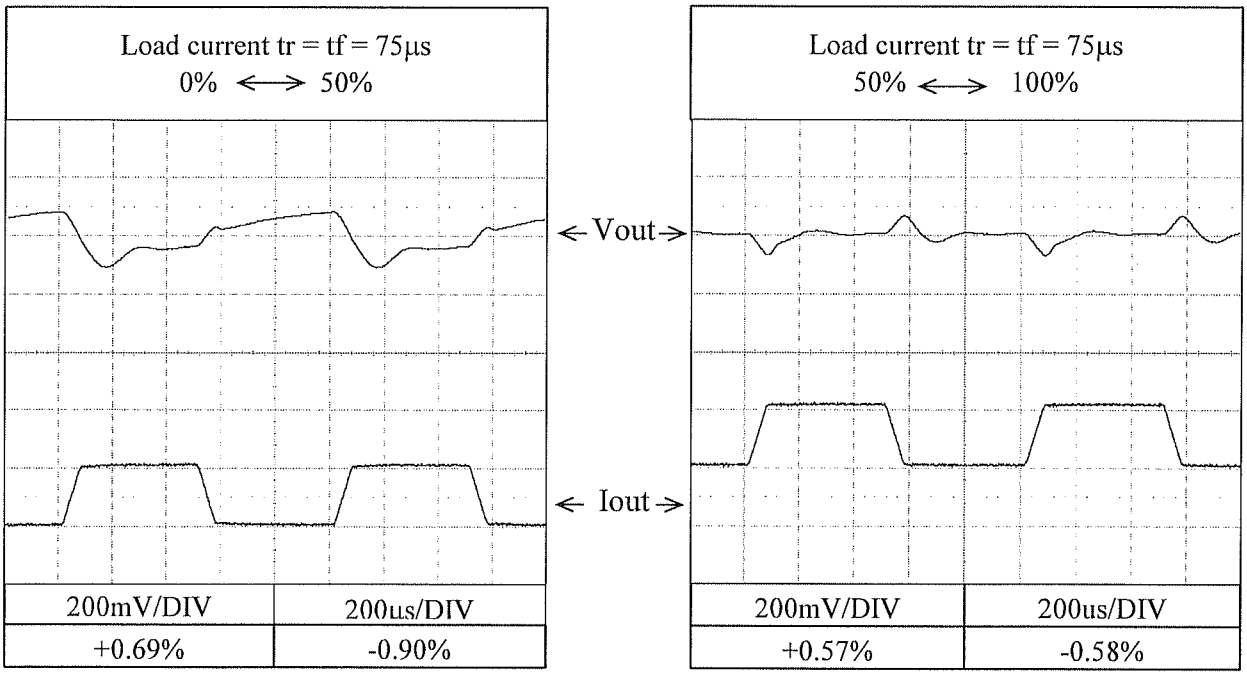
Conditions: Vin : 230VAC
Ta : 25°C

12V

f=100Hz



f=1kHz

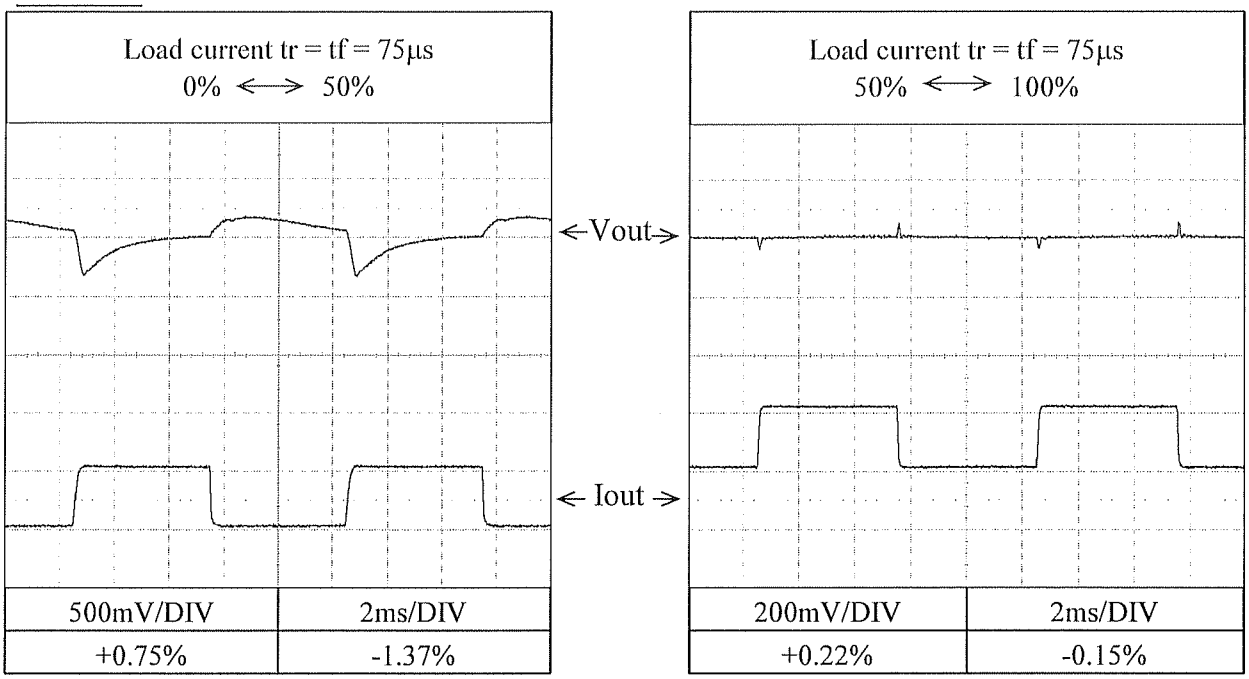


2.8 Dynamic load response characteristics

Conditions: Vin : 115VAC
Ta : 25°C

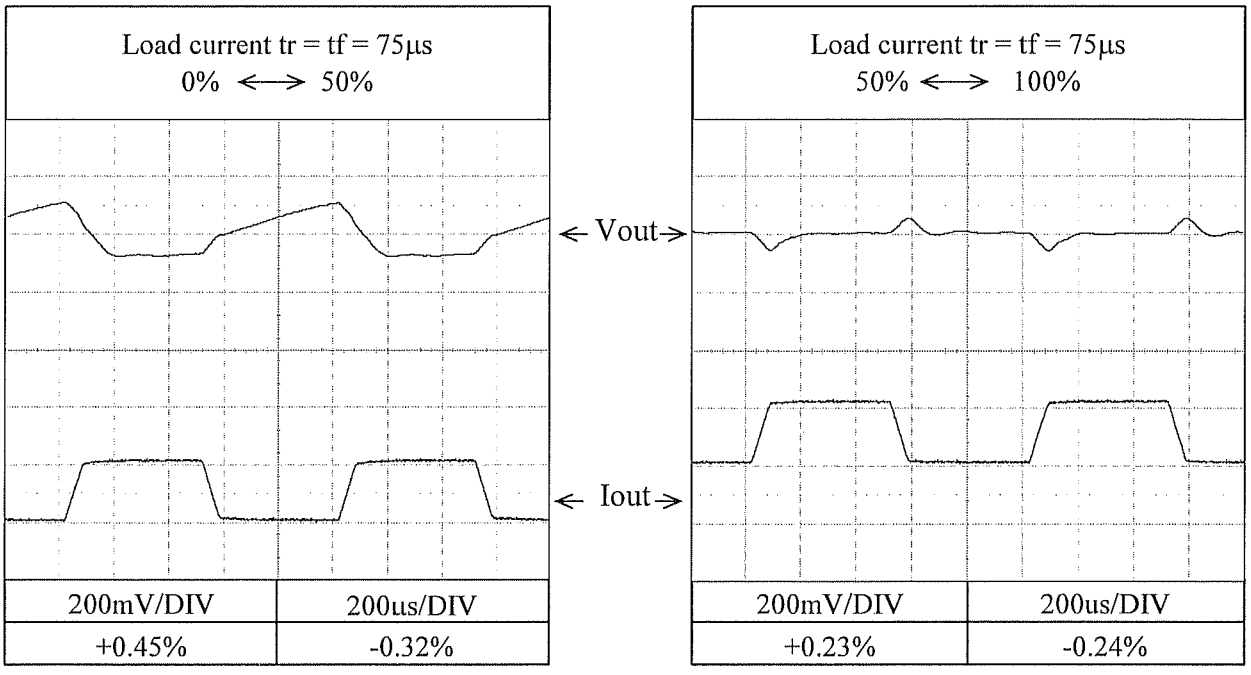
24V

f=100Hz



500mV/DIV	2ms/DIV	200mV/DIV	2ms/DIV
+0.75%	-1.37%	+0.22%	-0.15%

f=1kHz



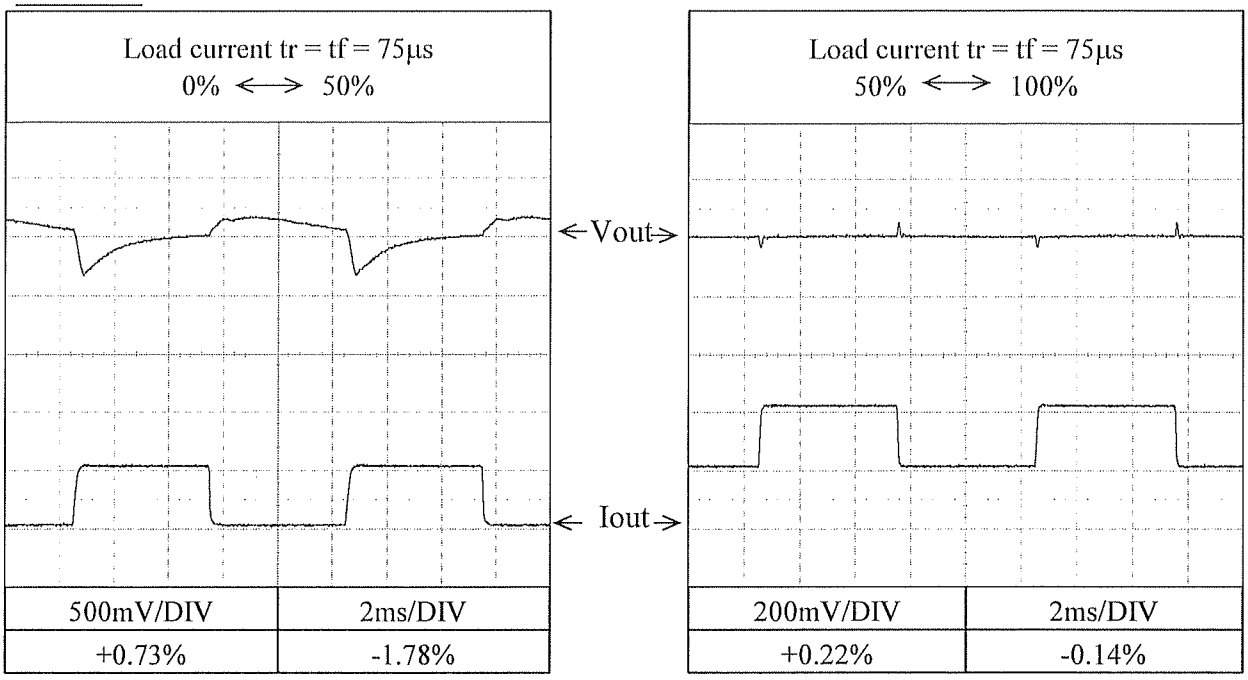
200mV/DIV	200us/DIV	200mV/DIV	200us/DIV
+0.45%	-0.32%	+0.23%	-0.24%

2.8 Dynamic load response characteristics

Conditions: Vin : 230VAC
Ta : 25°C

24V

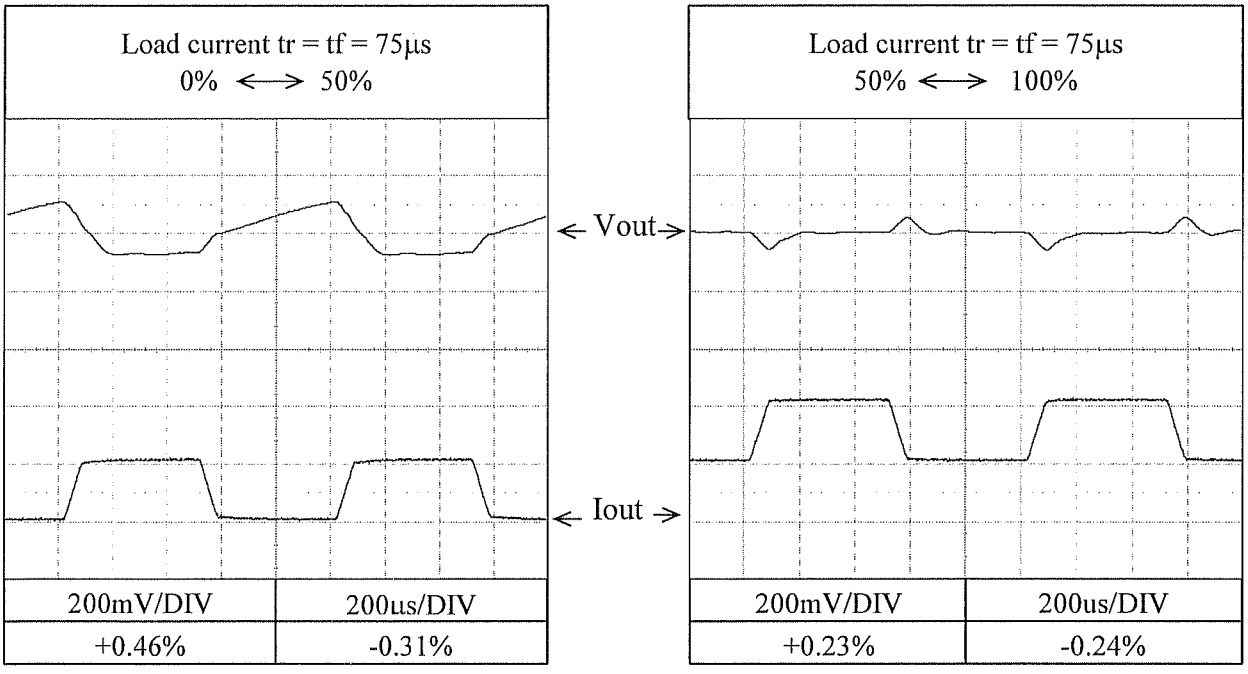
f=100Hz



500mV/DIV	2ms/DIV
+0.73%	-1.78%

200mV/DIV	2ms/DIV
+0.22%	-0.14%

f=1kHz



200mV/DIV	200us/DIV
+0.46%	-0.31%

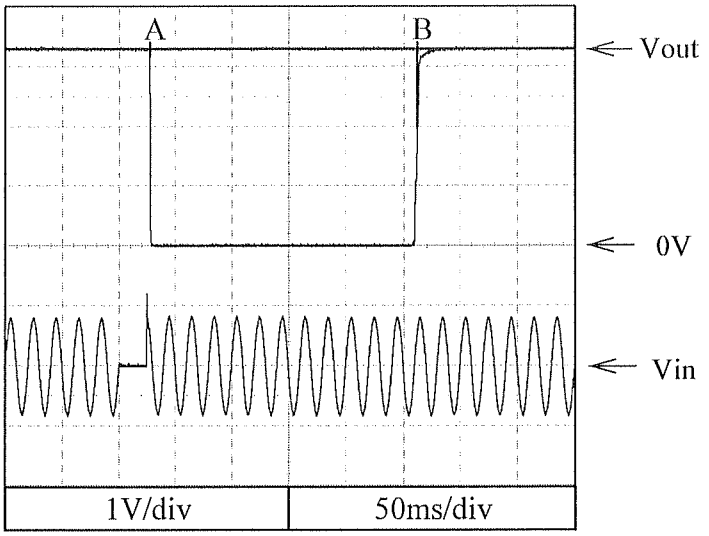
200mV/DIV	200us/DIV
+0.23%	-0.24%

2.9 Response to brownout characteristics

Conditions: Vin : 115VAC
Iout : 100%
Ta : 25°C

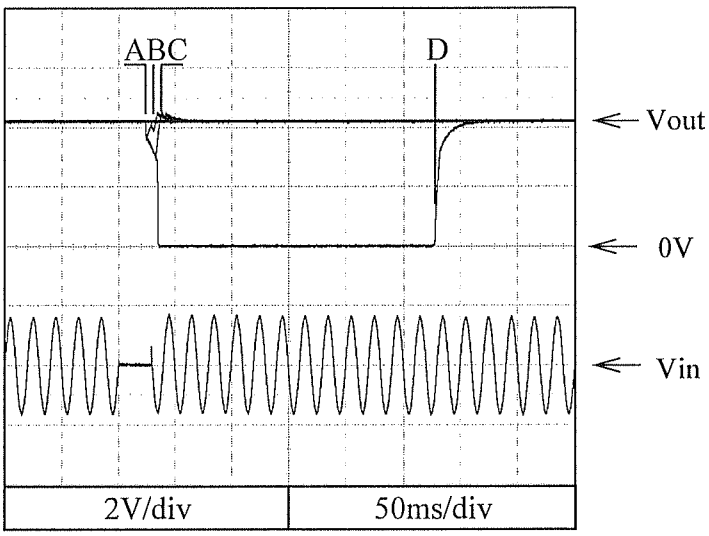
3V

A=24ms
B=25ms



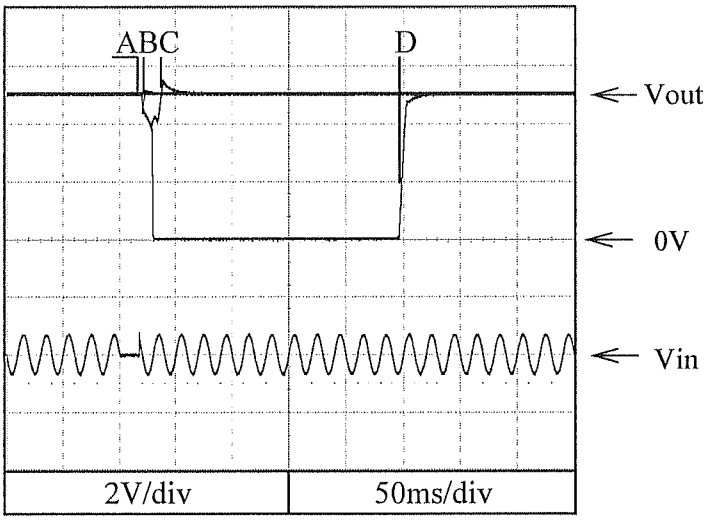
4V

A=18ms
B=19ms
C=28ms
D=29ms



5V

A=16ms
B=17ms
C=26ms
D=27ms

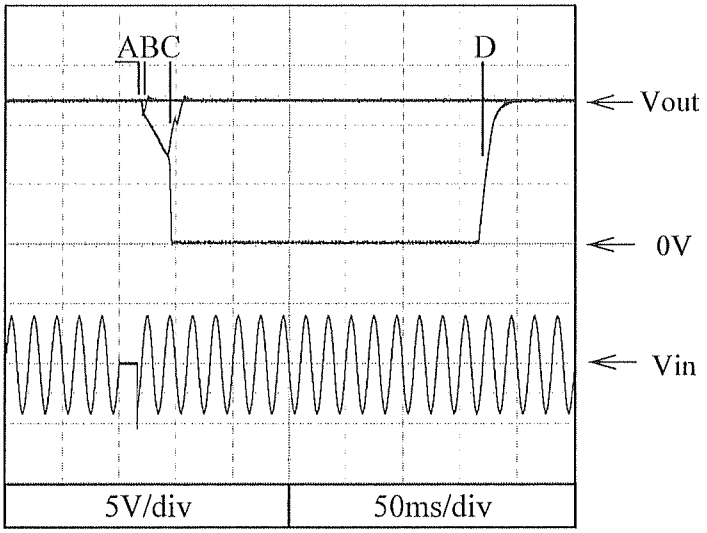


2.9 Response to brownout characteristics

Conditions: Vin : 115VAC
Iout : 100%
Ta : 25°C

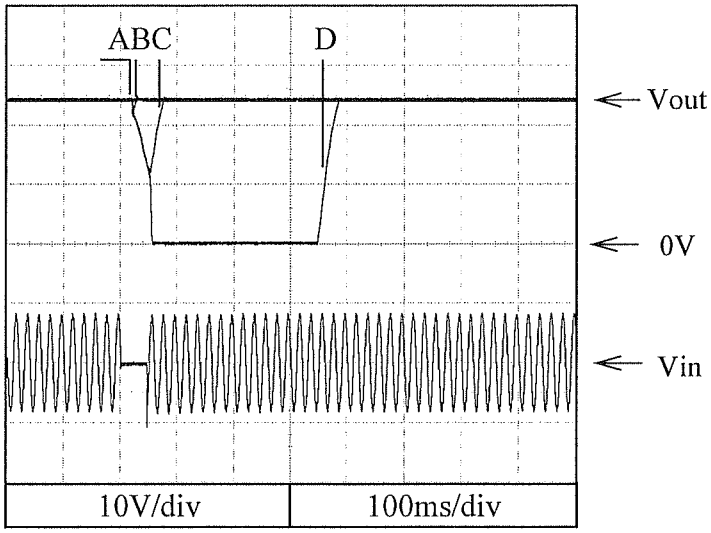
12V

A=15ms
B=16ms
C=38ms
D=39ms



24V

A=16ms
B=17ms
C=45ms
D=46ms

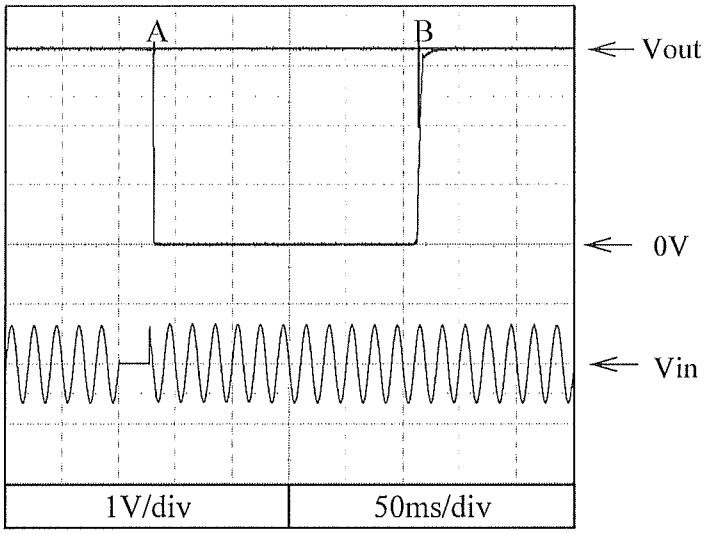


2.9 Response to brownout characteristics

Conditions: Vin : 230VAC
Iout : 100%
Ta : 25°C

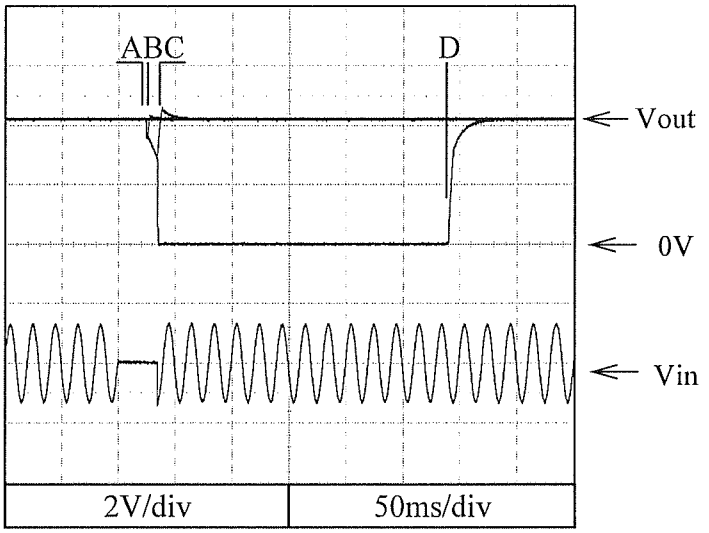
3V

A=26ms
B=27ms



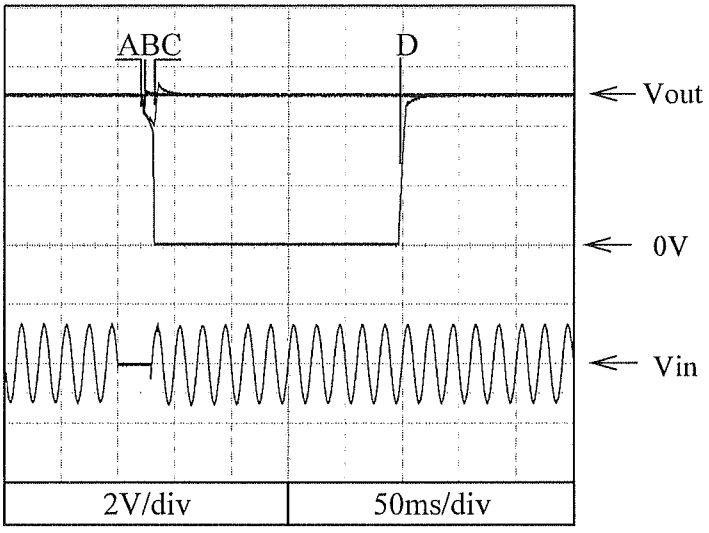
4V

A=24ms
B=25ms
C=34ms
D=35ms



5V

A=18ms
B=19ms
C=28ms
D=29ms

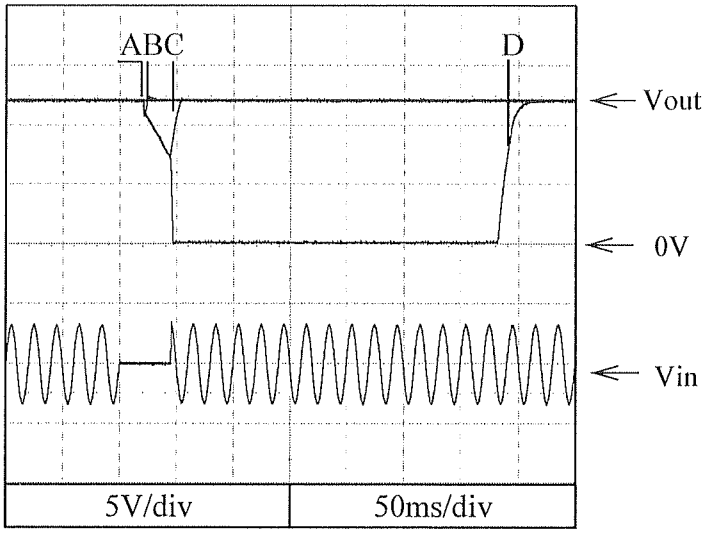


2.9 Response to brownout characteristics

Conditions: Vin : 230VAC
Iout : 100%
Ta : 25°C

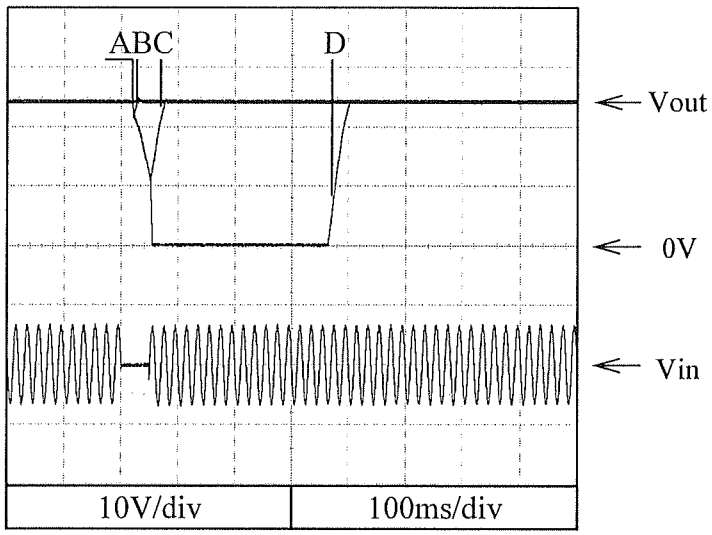
12V

A=17ms
B=18ms
C=44ms
D=45ms



24V

A=18ms
B=19ms
C=48ms
D=49ms

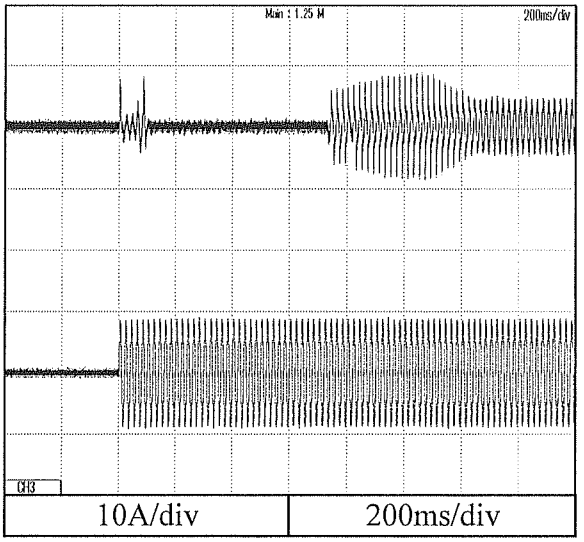


2.10 Inrush current waveform

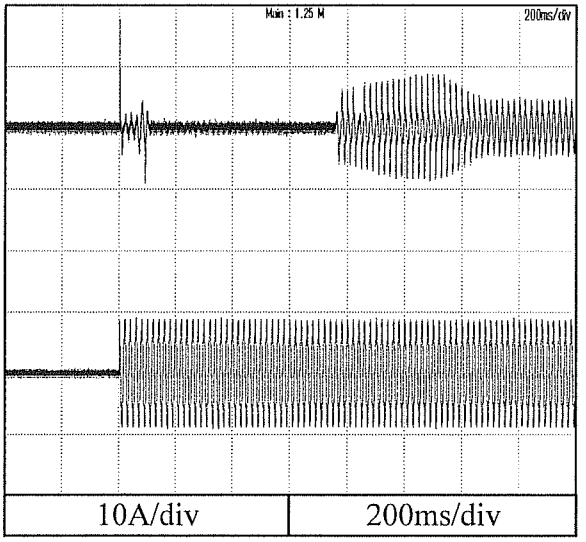
Conditions: Vin : 115VAC
Iout : 100%
Ta : 25°C

5V

Switch on phase angle of input AC voltage $\phi = 0^{o}$



Switch on phase angle of input AC voltage $\phi = 90^{o}$

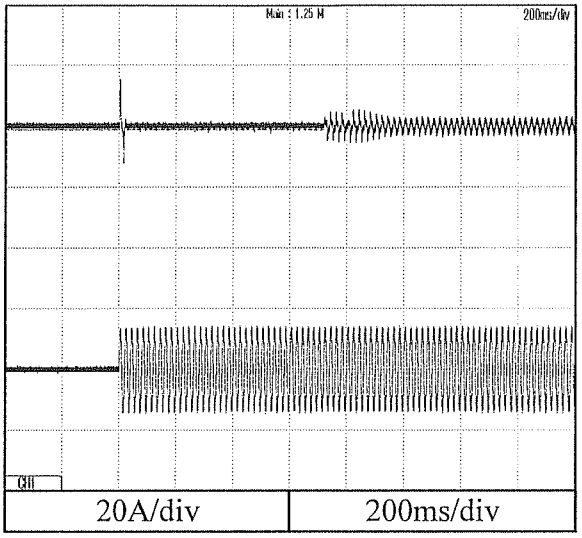


2.10 Inrush current waveform

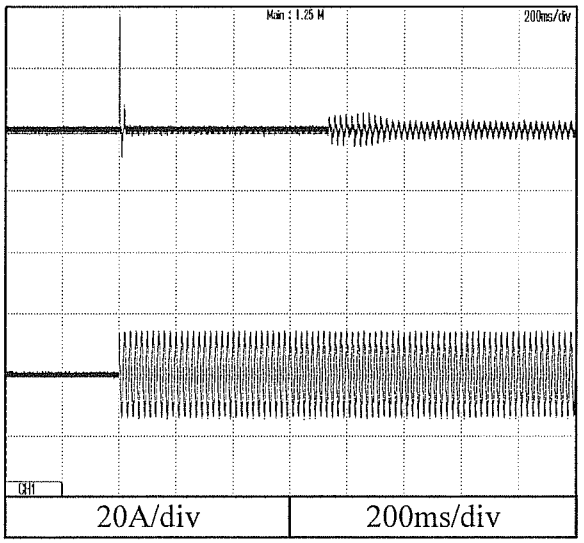
Conditions: Vin : 230VAC
Iout : 100%
Ta : 25°C

5V

Switch on phase angle of input AC voltage $\phi = 0^{\circ}$



Switch on phase angle of input AC voltage $\phi = 90^{\circ}$

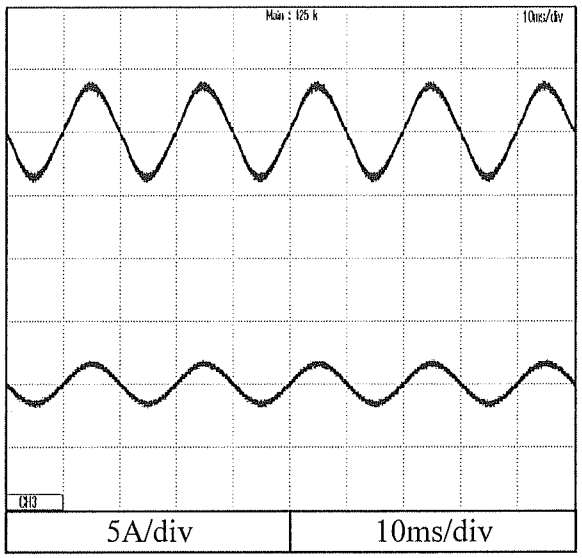


2.11 Input current waveform

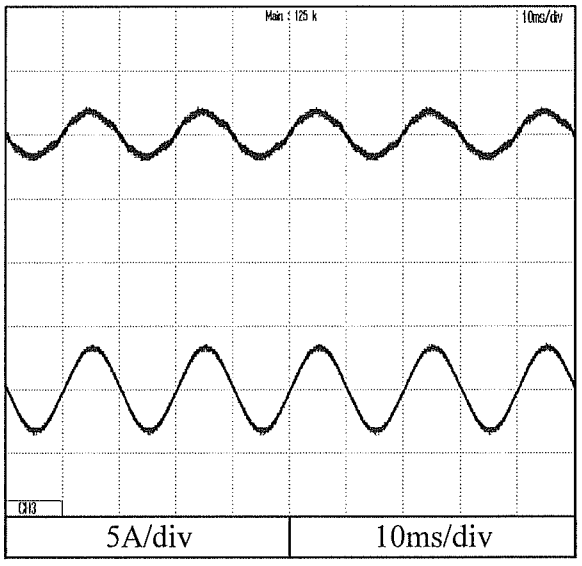
Conditions: Iout : 100%
Ta : 25°C

5V

Vin : 115VAC



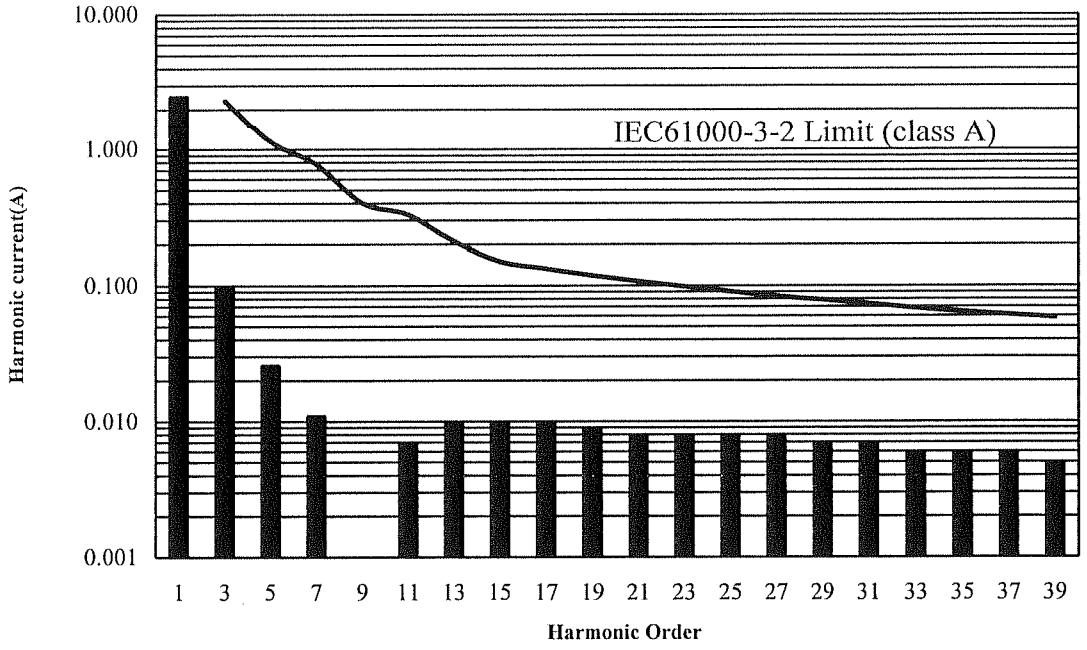
Vin : 230VAC



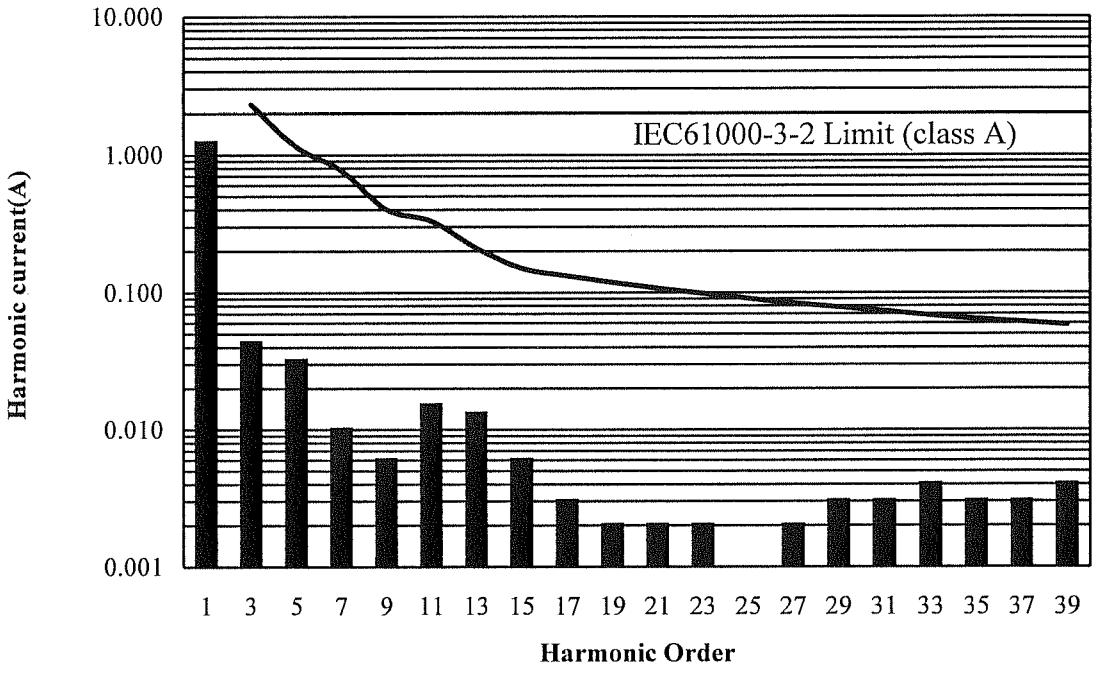
2.12 Input current harmonics

Conditions: Vin : 115VAC
Iout : 100%
Ta : 25°C

5V



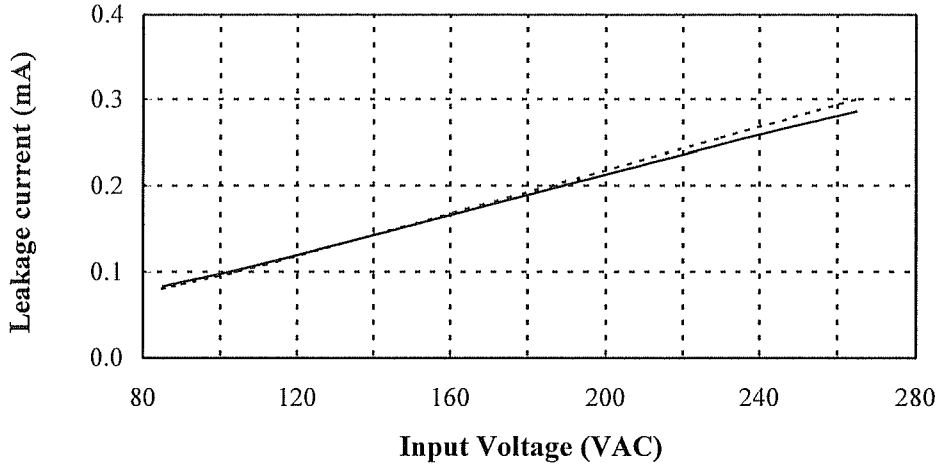
Conditions: Vin : 230VAC
Iout : 100%
Ta : 25°C



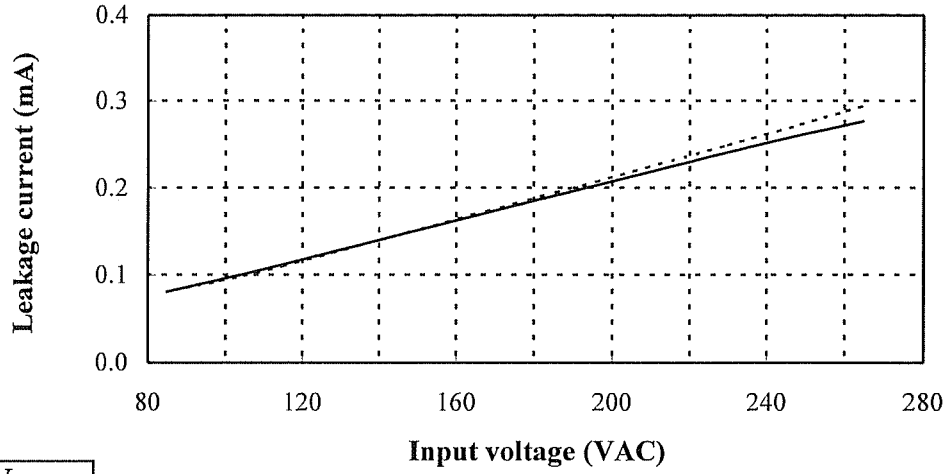
2.13 Leakage current characteristics

Conditions: Iout : 0% ------
: 100% ———
Ta : 25°C
f : 50Hz
Equipment used : MODEL 228
(Simpson)

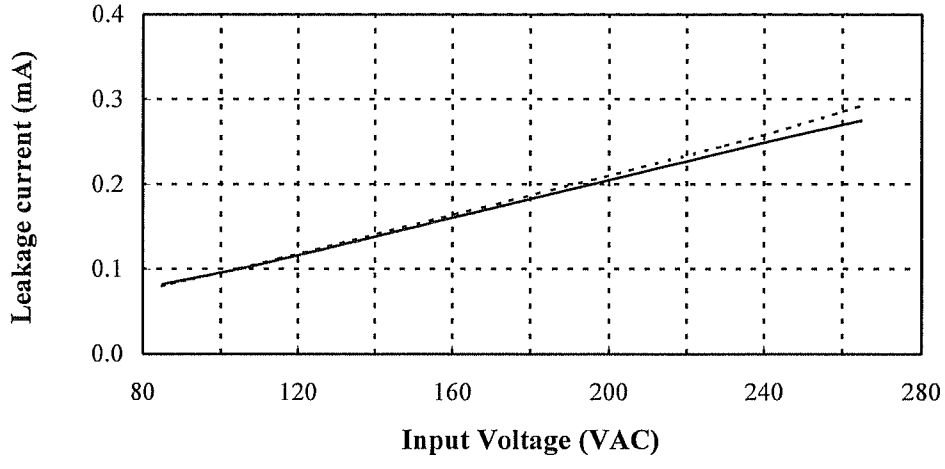
3V



4V



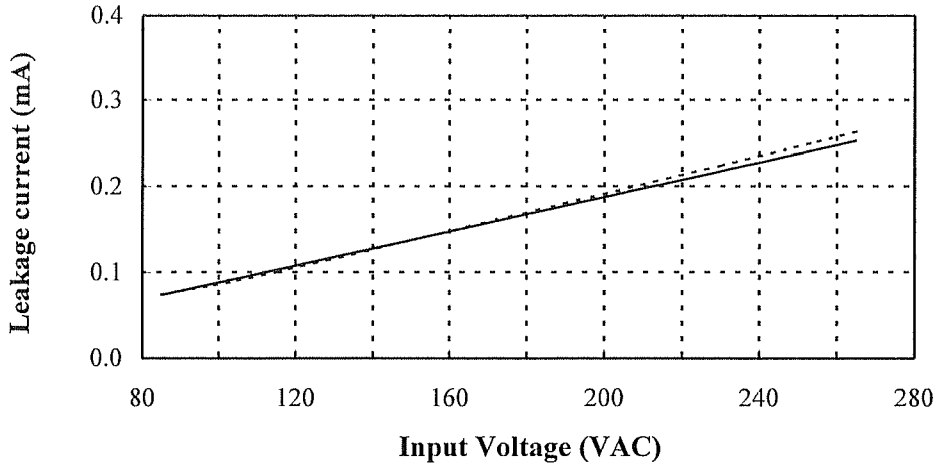
5V



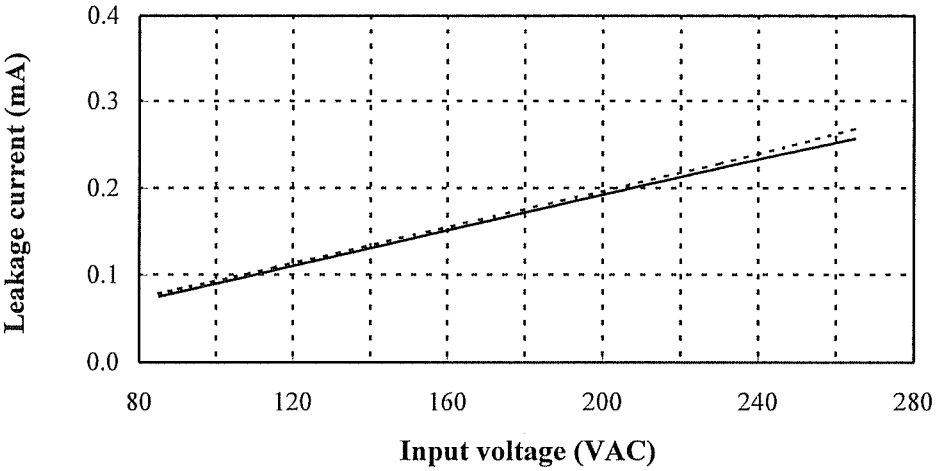
2.13 Leakage current characteristics

Conditions: Iout : 0% ------
: 100% ———
Ta : 25°C
f : 50Hz
Equipment used : MODEL 228
(Simpson)

12V



24V

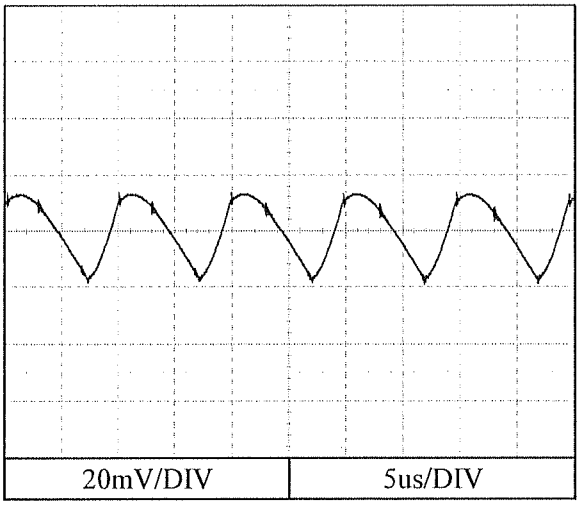


2.14 Output ripple and noise waveform

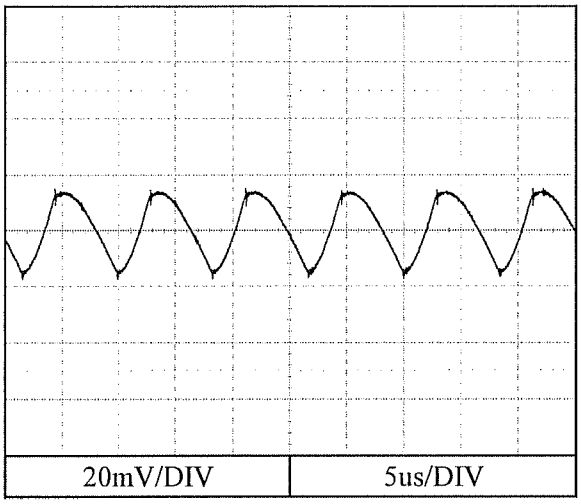
Conditions: Vin : 115VAC
Iout : 100%
Ta : 25°C

NORMAL MODE

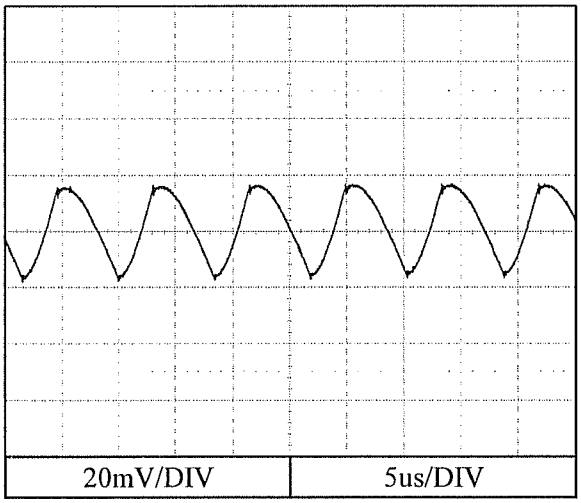
3V



4V



5V

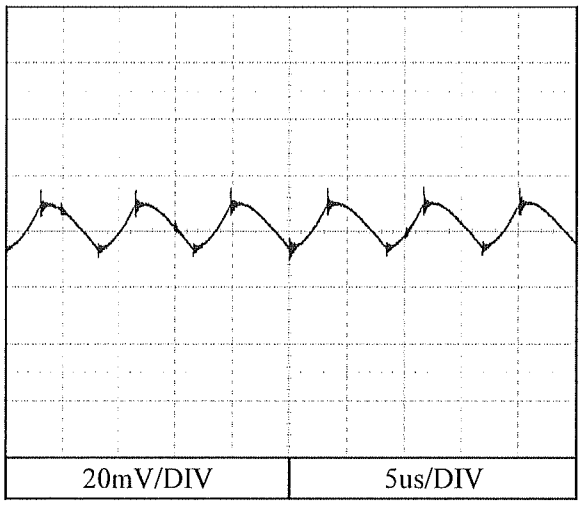


2.14 Output ripple and noise waveform

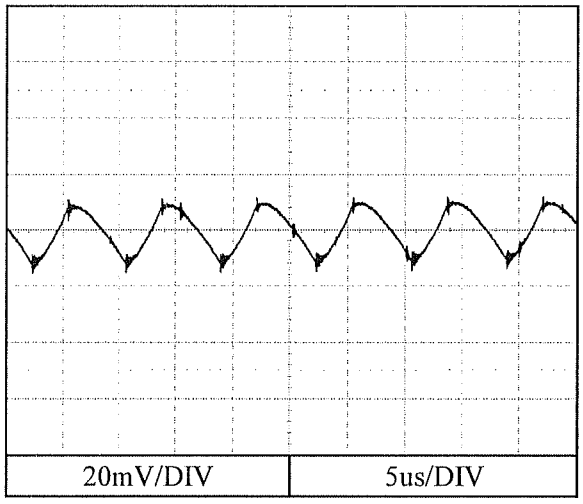
Conditions: Vin : 115VAC
Iout : 100%
Ta : 25°C

NORMAL MODE

12V



24V

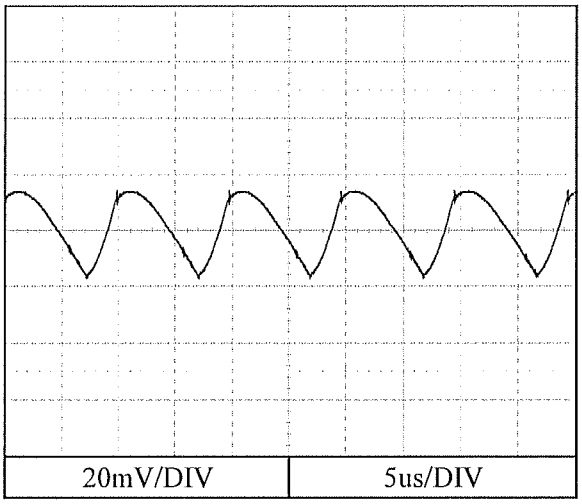


2.14 Output ripple and noise waveform

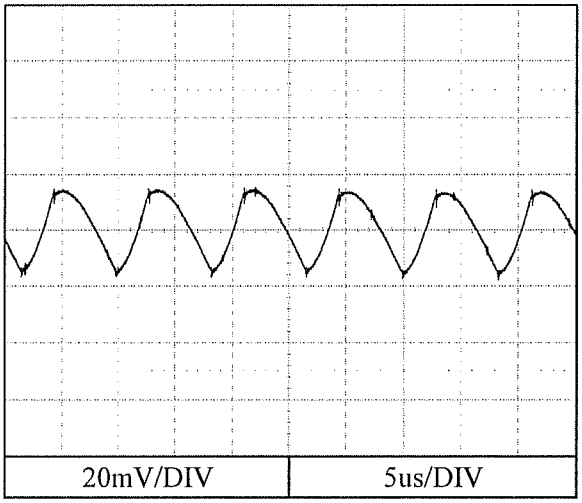
Conditions: Vin : 230VAC
Iout : 100%
Ta : 25°C

NORMAL MODE

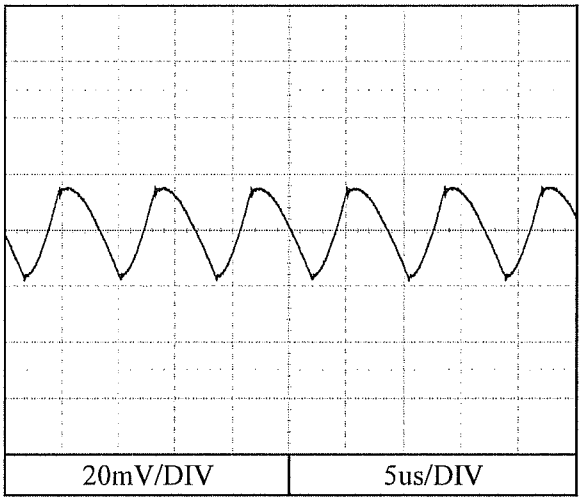
3V



4V



5V

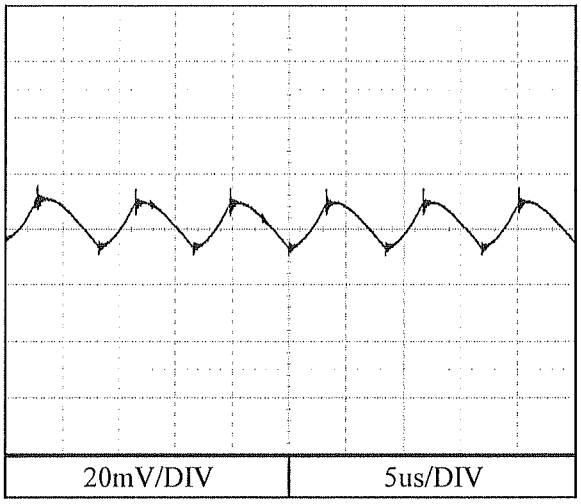


2.14 Output ripple and noise waveform

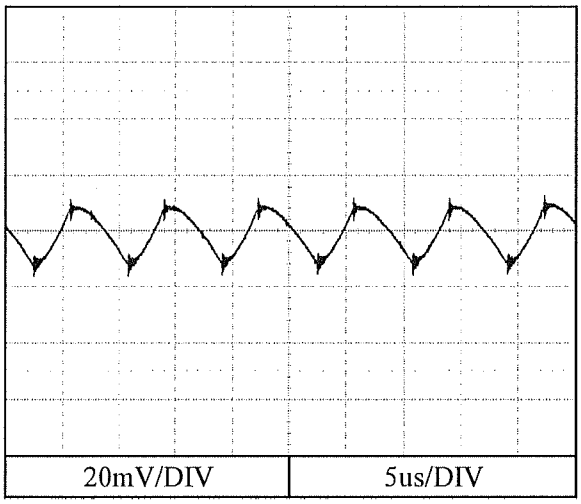
Conditions: Vin : 230VAC
Iout : 100%
Ta : 25°C

NORMAL MODE

12V



24V

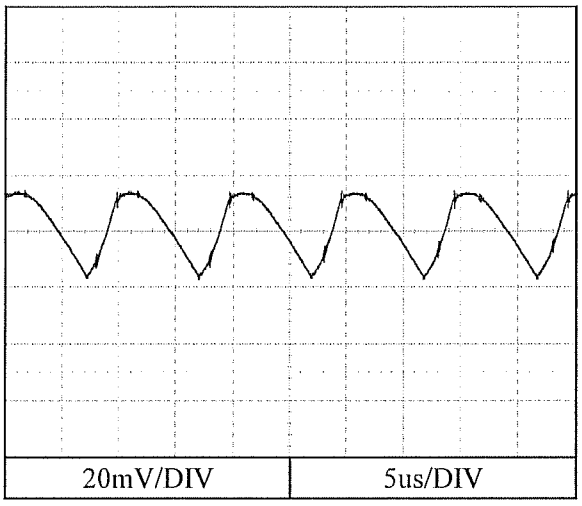


2.14 Output ripple and noise waveform

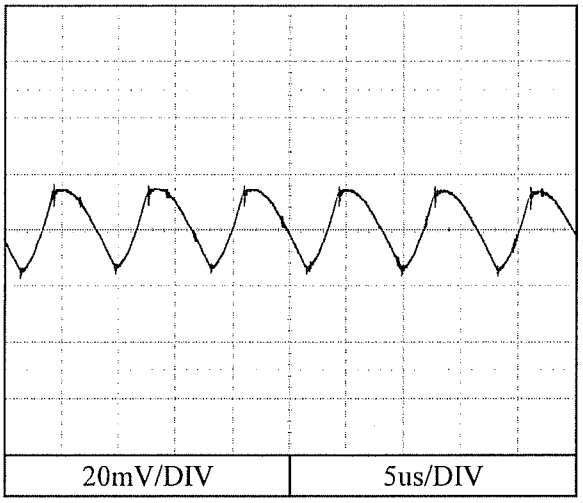
Conditions: Vin : 115VAC
Iout : 100%
Ta : 25°C

NORMAL+COMMON MODE

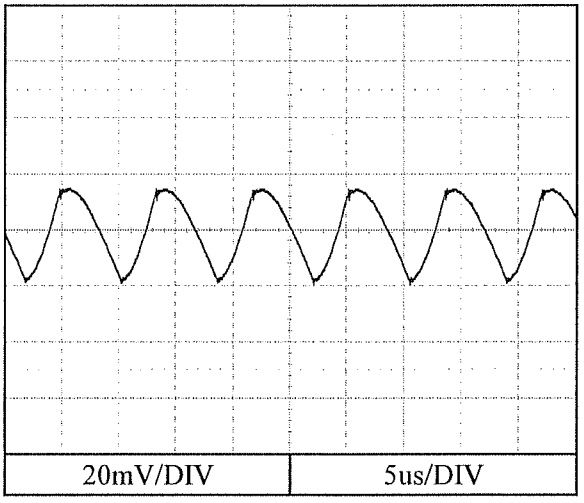
3V



4V



5V

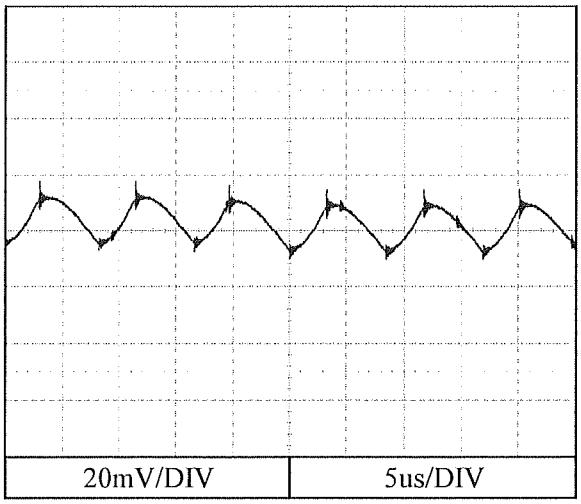


2.14 Output ripple and noise waveform

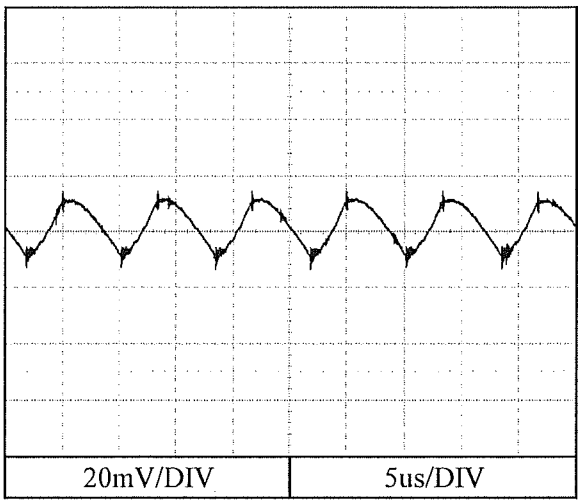
Conditions: Vin : 115VAC
Iout : 100%
Ta : 25°C

NORMAL+COMMON MODE

12V



24V

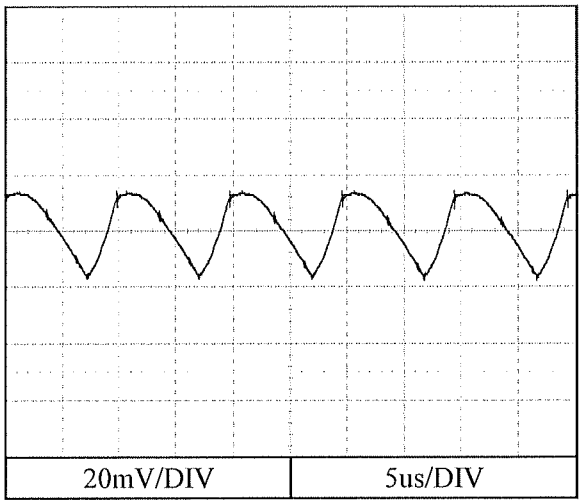


2.14 Output ripple and noise waveform

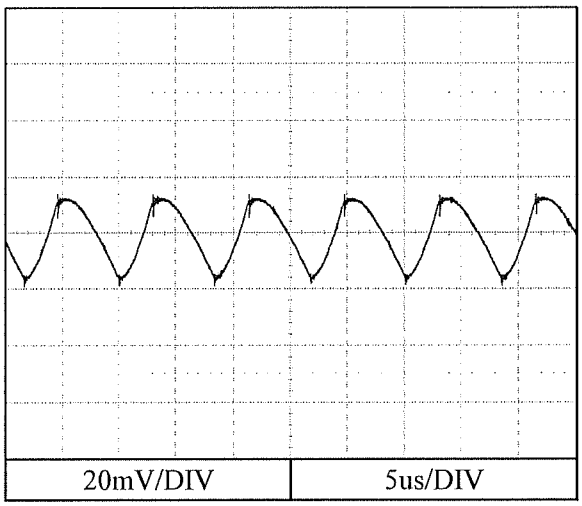
Conditions: Vin : 230VAC
Iout : 100%
Ta : 25°C

NORMAL+COMMON MODE

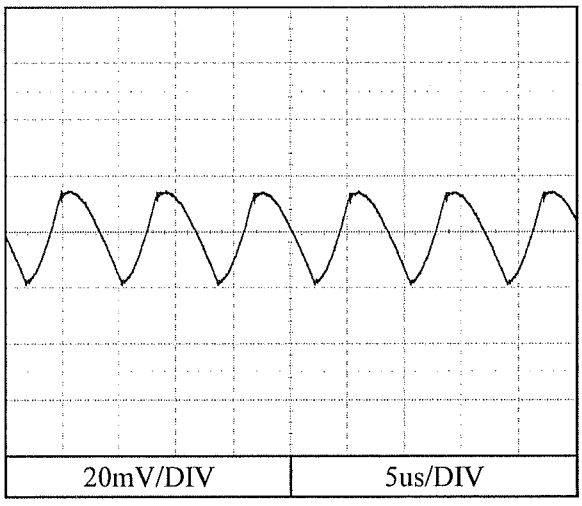
3V



4V



5V

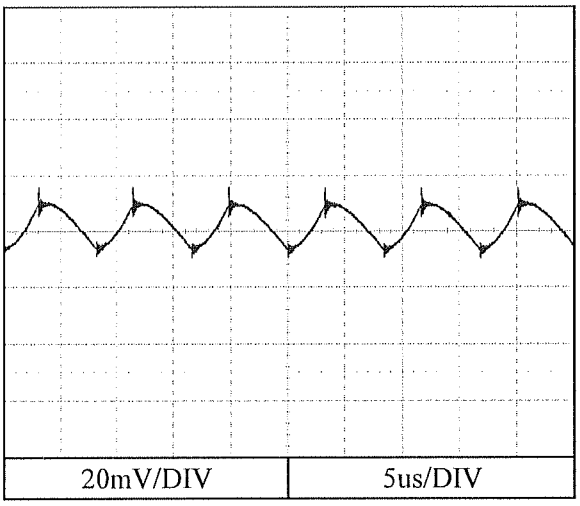


2.14 Output ripple and noise waveform

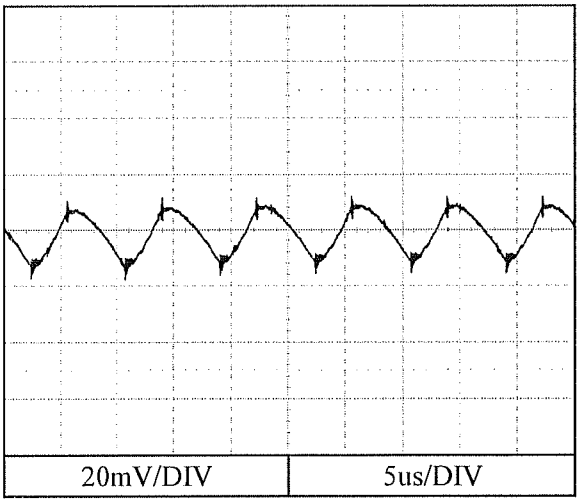
Conditions: Vin : 230VAC
Iout : 100%
Ta : 25°C

NORMAL+COMMON MODE

12V



24V



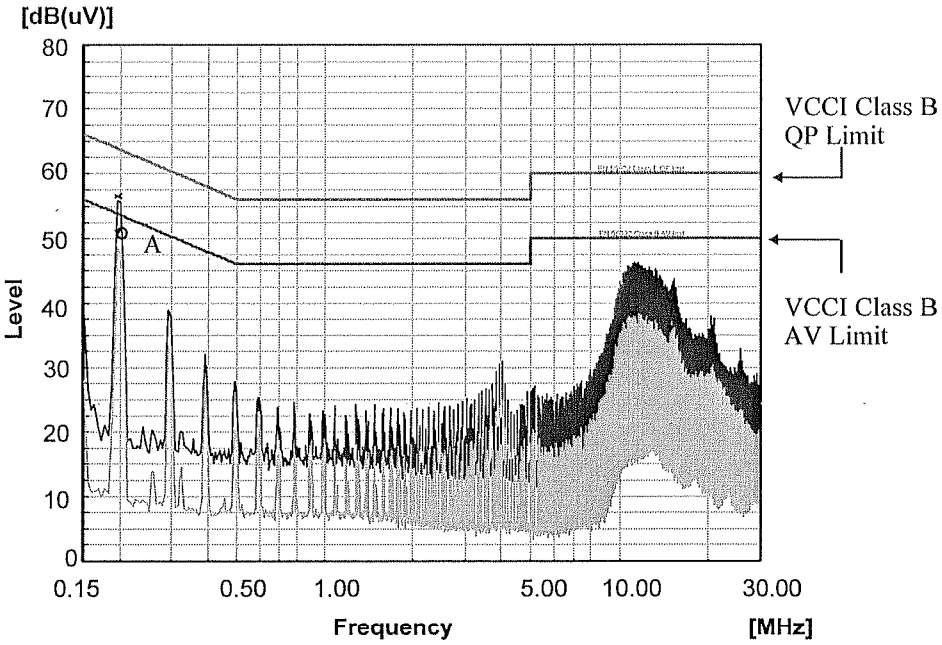
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 115VAC
Iout : 100%

Conducted Emission

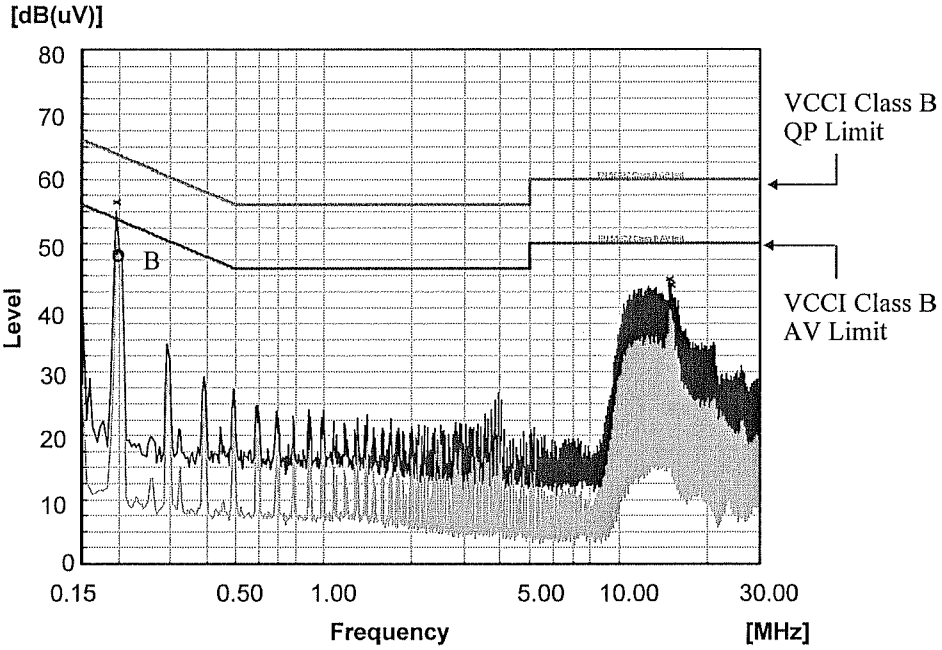
3V

Ref. / Data	Point A (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.7	56.5
AV	54.7	50.9



Phase : L

Ref. / Data	Point B (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.7	56.5
AV	54.7	48.4



Phase : N

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

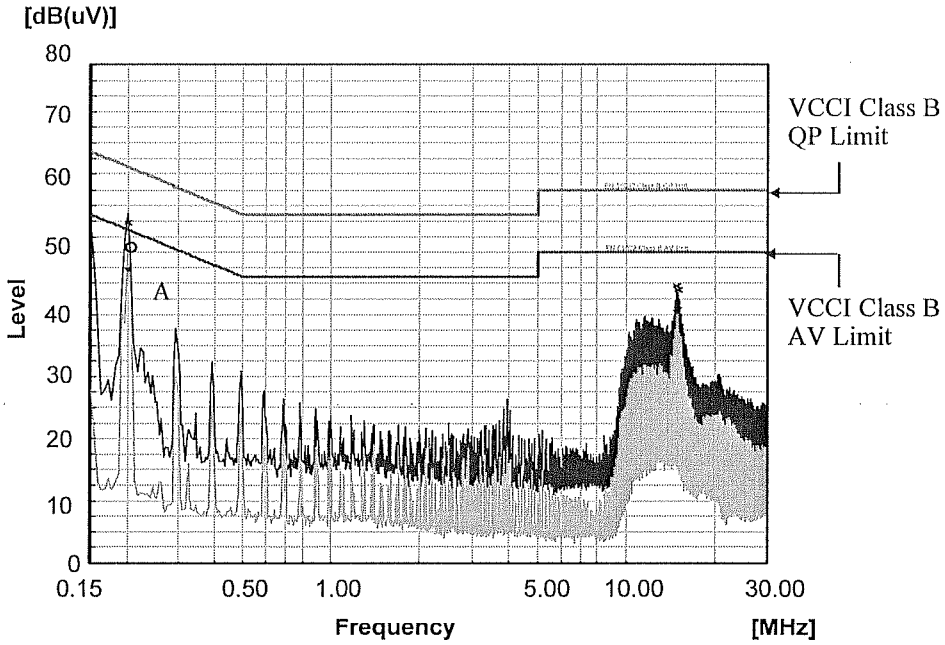
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 230VAC
Iout : 100%

Conducted Emission

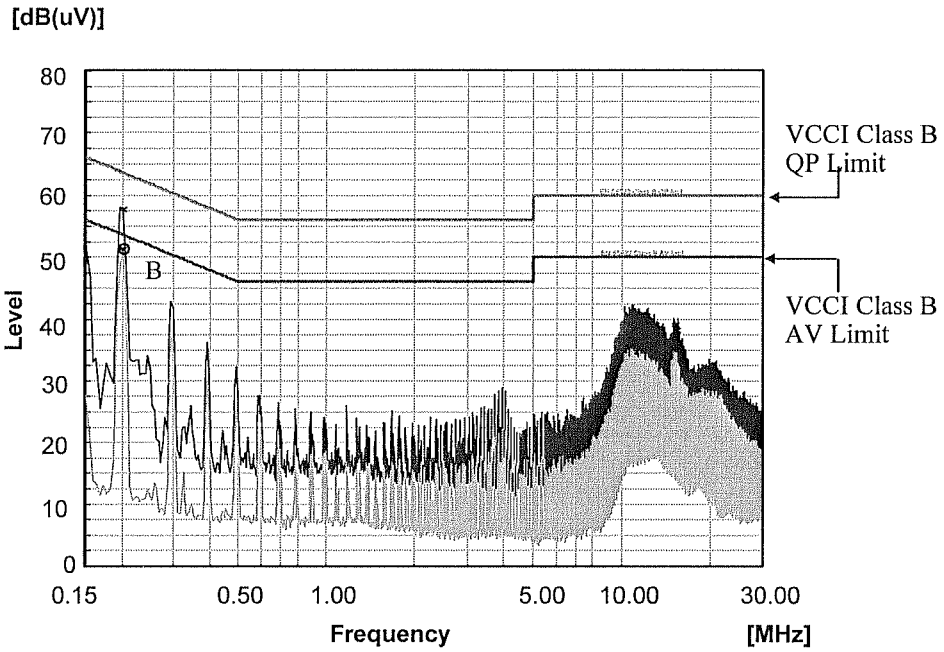
3V

Ref. / Data	Point A (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.6	54.7
AV	54.6	47.1



Phase : L

Ref. / Data	Point B (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.6	57.6
AV	54.6	51.2



Phase : N

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

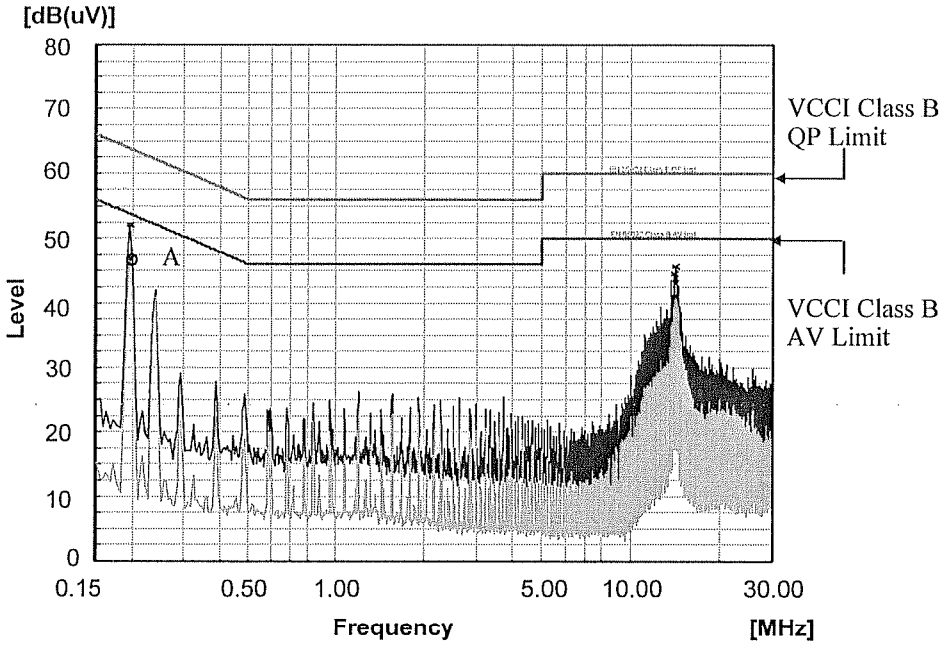
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 115VAC
Iout : 100%

Conducted Emission

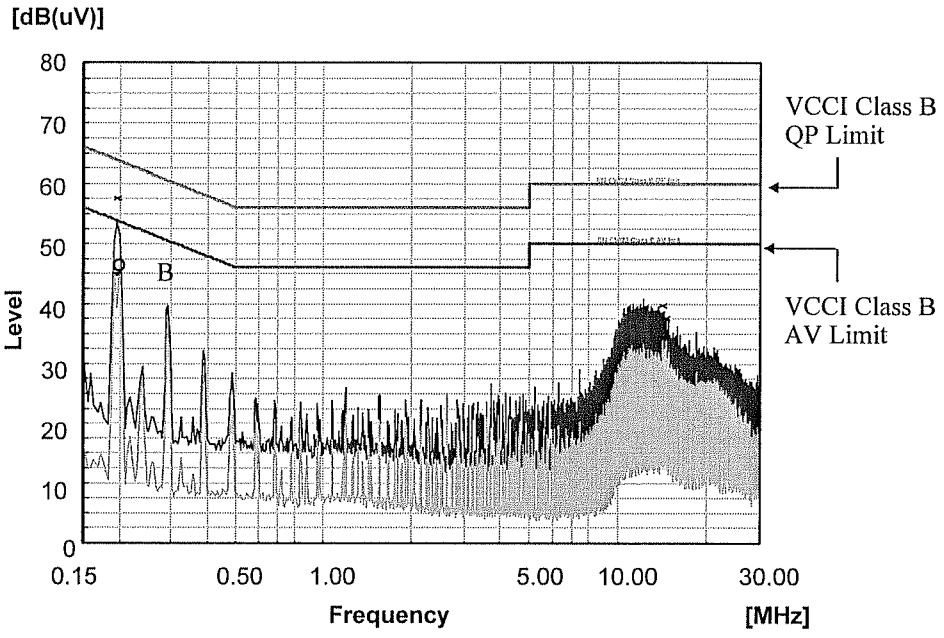
4V

Ref. / Data	Point A (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.7	52.1
AV	54.7	46.7



Phase : L

Ref. / Data	Point B (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.7	57.6
AV	54.7	44.8



Phase : N

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

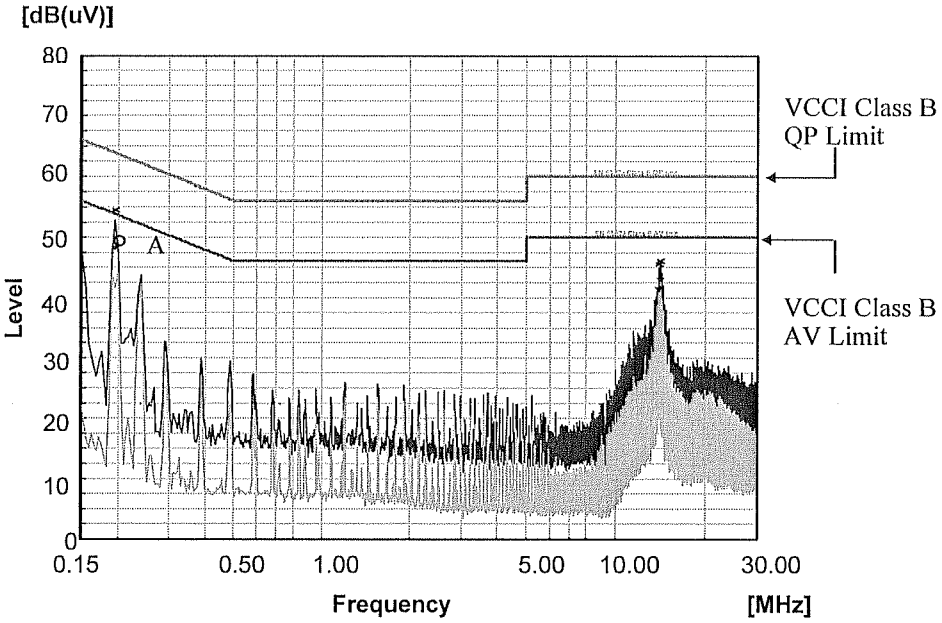
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 230VAC
Iout : 100%

Conducted Emission

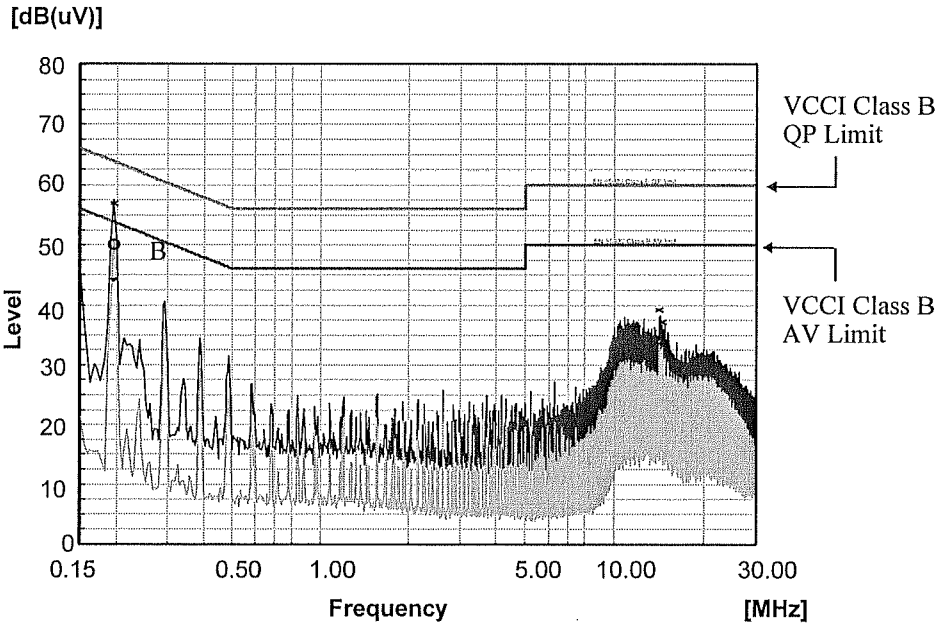
4V

Ref. / Data	Point A (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.7	54.4
AV	54.7	48.1



Phase : L

Ref. / Data	Point B (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.7	56.9
AV	54.7	44.0



Phase : N

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

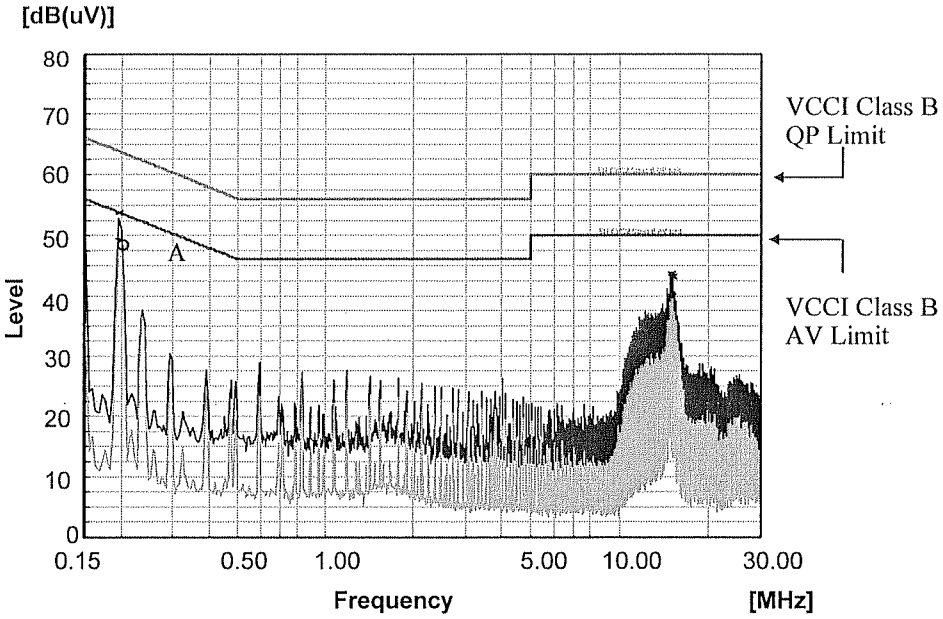
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 115VAC
Iout : 100%

Conducted Emission

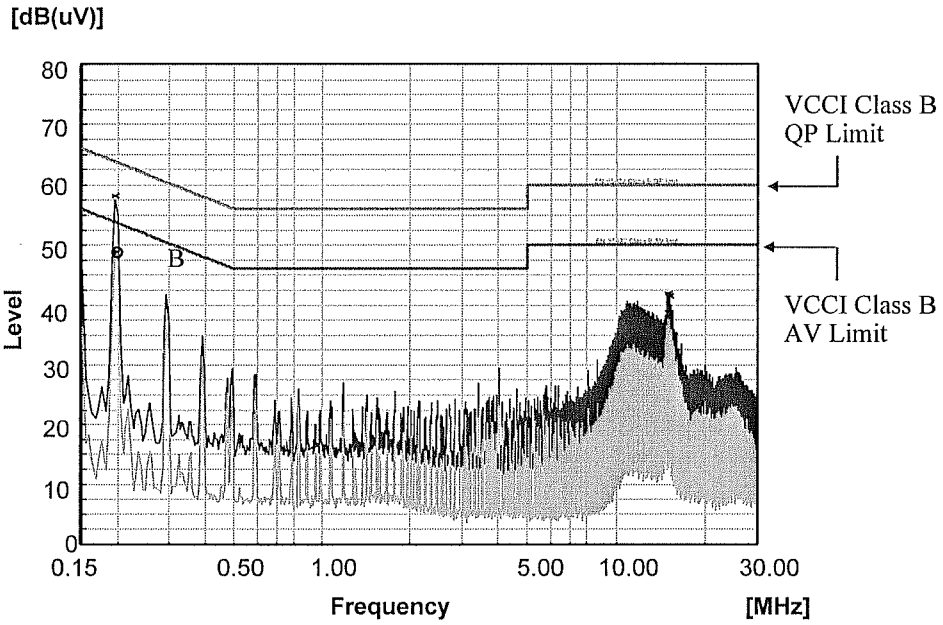
5V

Ref. / Data	Point A (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.7	53.7
AV	54.7	49.2



Phase : L

Ref. / Data	Point B (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.7	58.2
AV	54.7	48.6



Phase : N

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

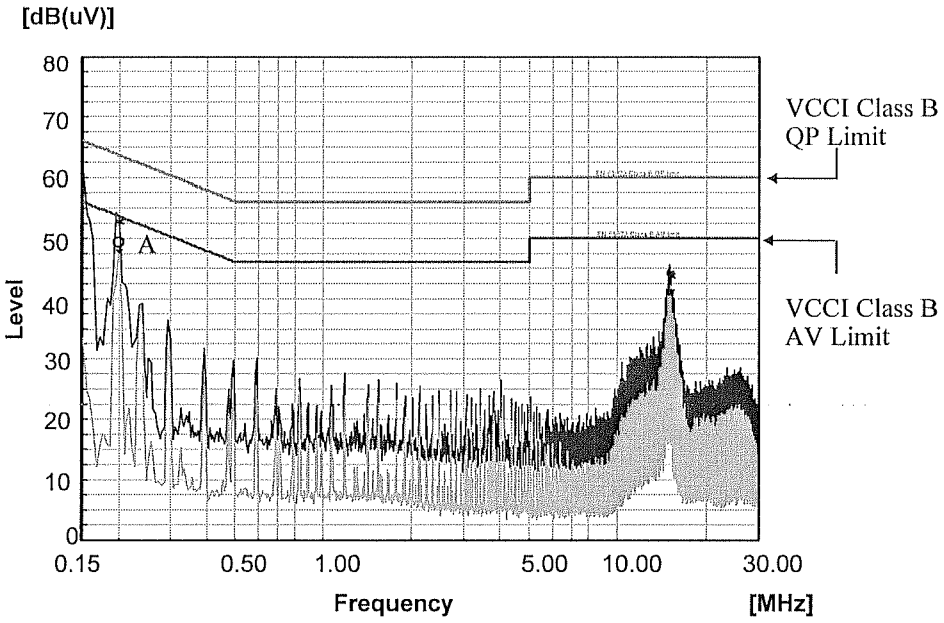
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 230VAC
Iout : 100%

Conducted Emission

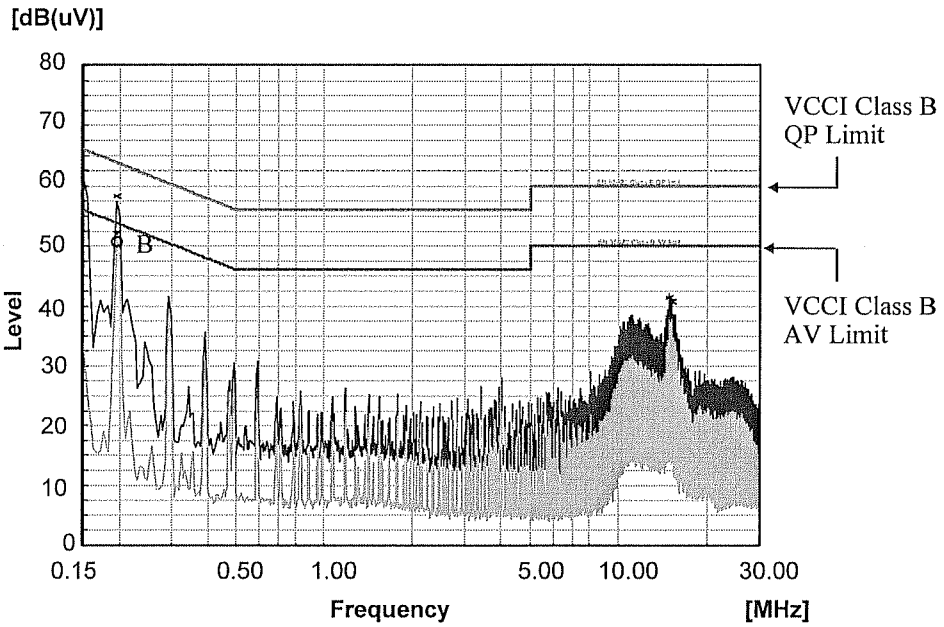
5V

Ref. / Data	Point A (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.7	52.6
AV	54.7	47.7



Phase : L

Ref. / Data	Point B (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.7	58.3
AV	54.7	51.6



Phase : N

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

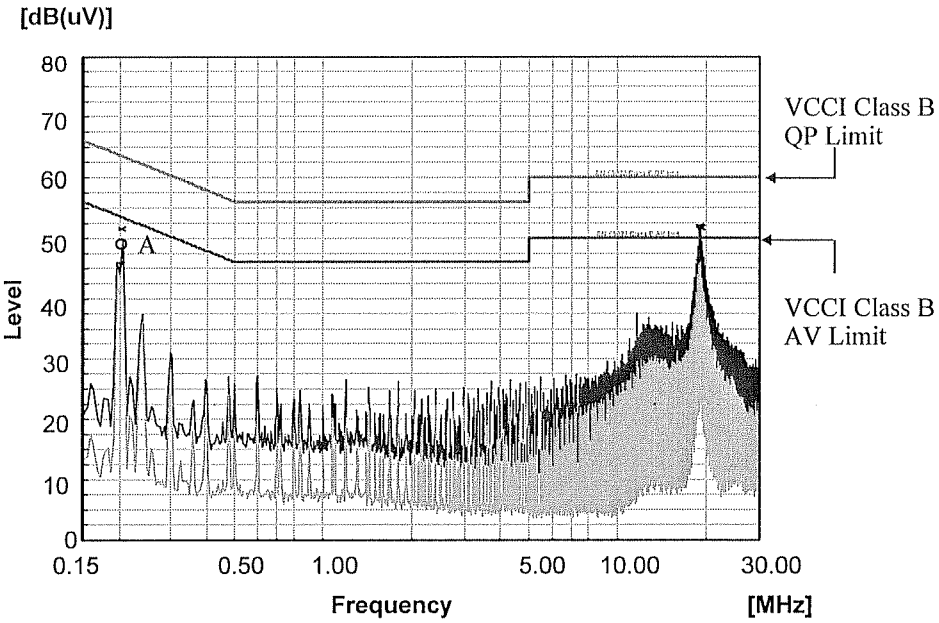
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 115VAC
Iout : 100%

Conducted Emission

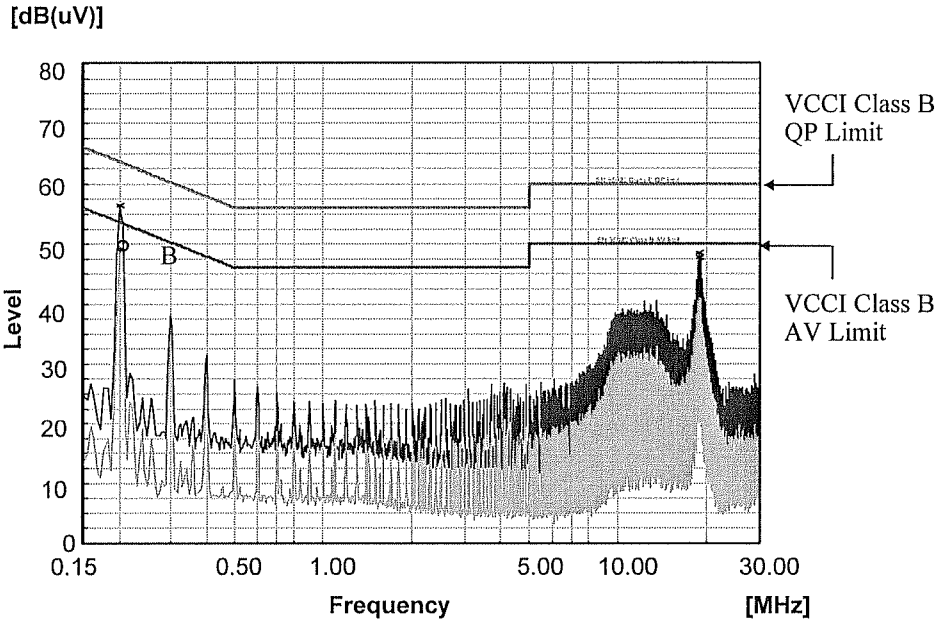
12V

Ref. / Data	Point A (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.5	51.6
AV	54.5	45.7



Phase : L

Ref. / Data	Point B (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	65.6	56.4
AV	54.6	48.9



Phase : N

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

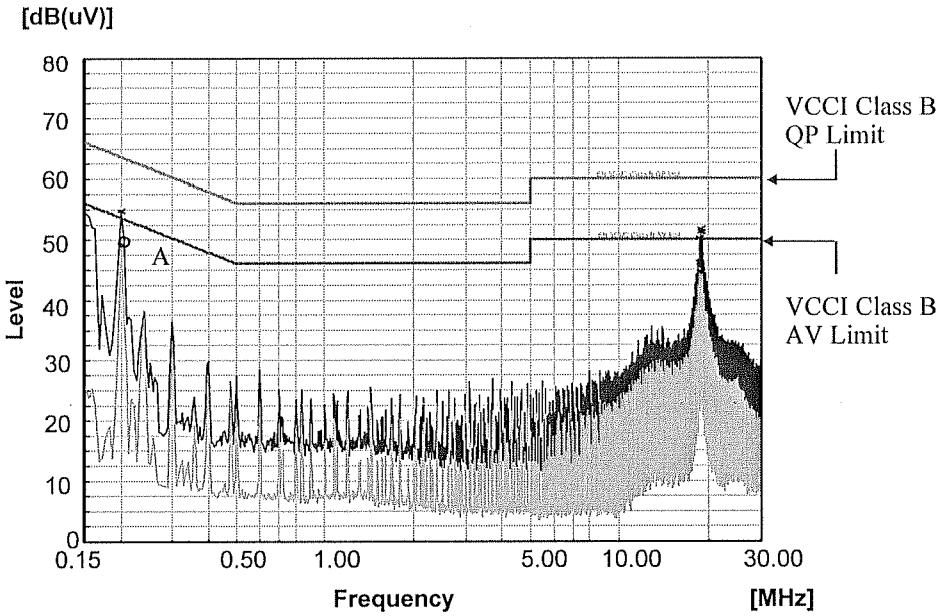
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 230VAC
Iout : 100%

Conducted Emission

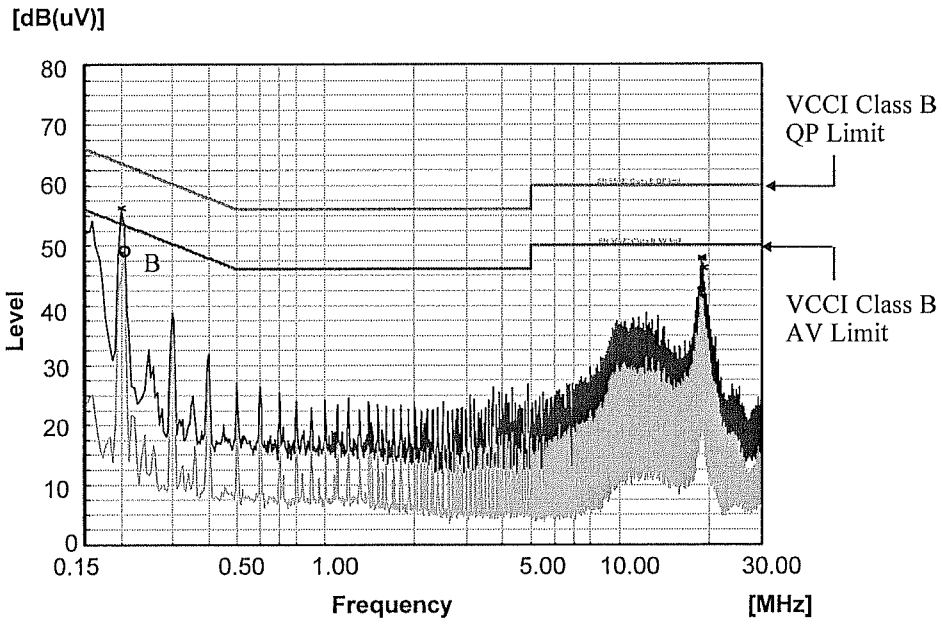
12V

Ref. / Data	Point A (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.6	54.7
AV	54.6	49.0



Phase : L

Ref. / Data	Point B (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.6	56.3
AV	54.6	48.6



Phase : N

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

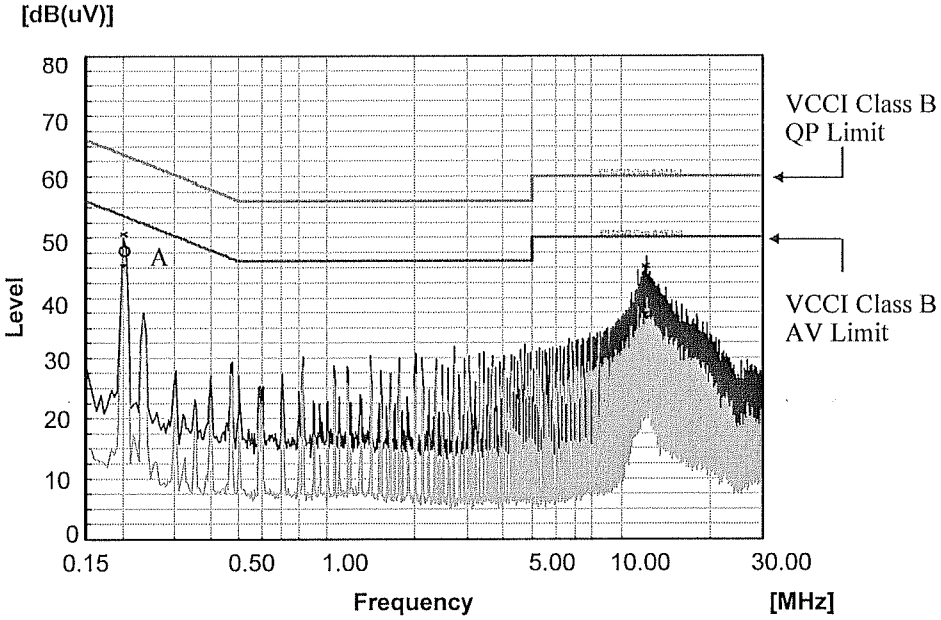
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 115VAC
Iout : 100%

Conducted Emission

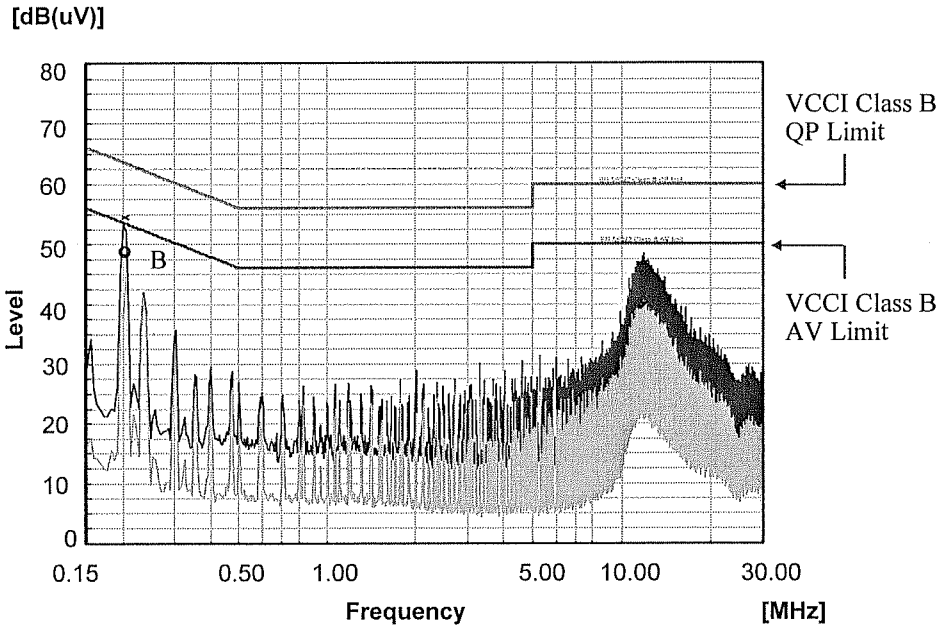
24V

Ref. / Data	Point A (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.6	50.5
AV	54.6	45.2



Phase : L

Ref. / Data	Point B (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.6	54.4
AV	54.6	48.0



Phase : N

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

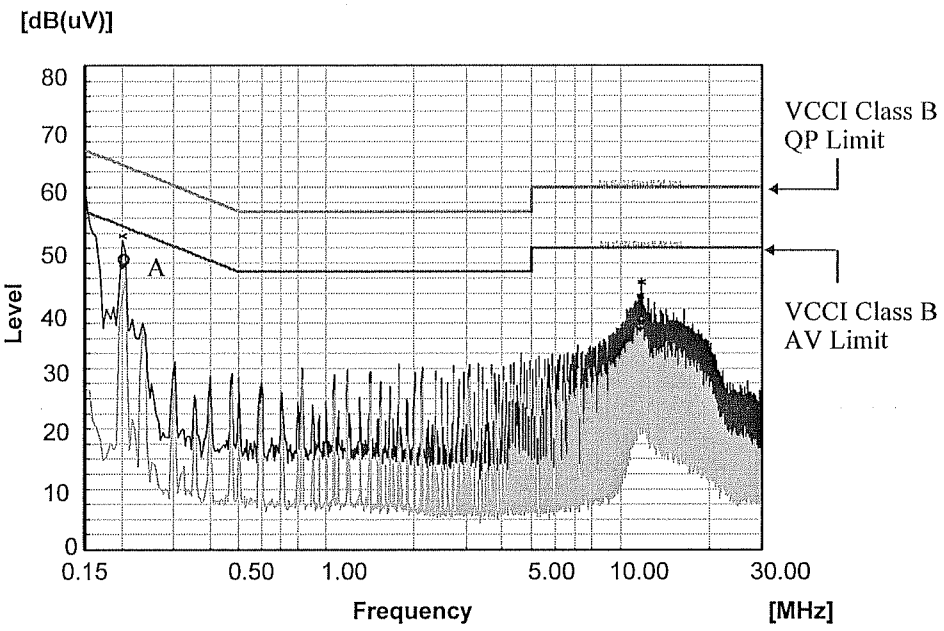
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 230VAC
Iout : 100%

Conducted Emission

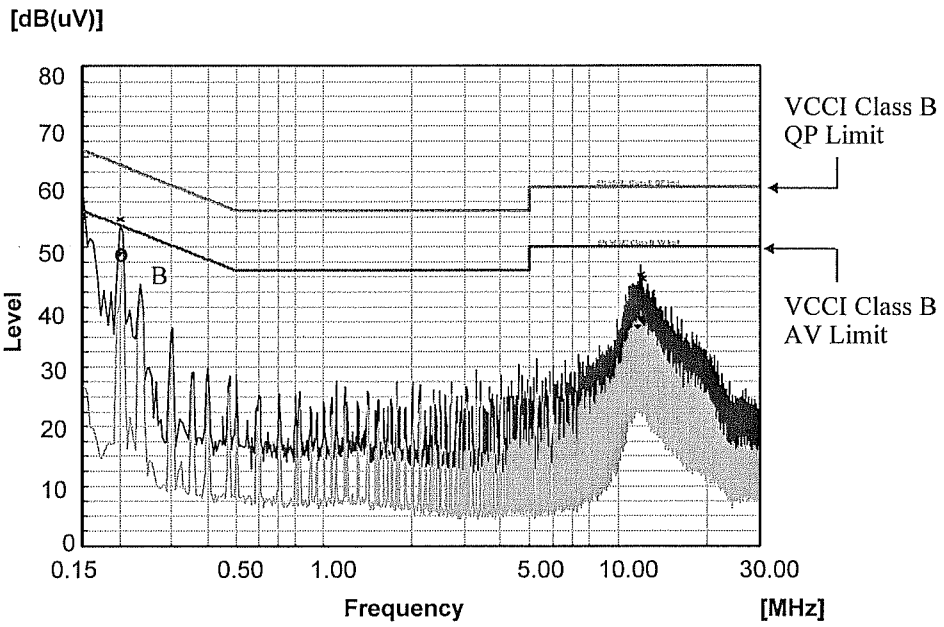
24V

Ref. / Data	Point A (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.6	52.0
AV	54.6	46.8



Phase : L

Ref. / Data	Point B (0.20MHz) Limit (dBμV)	Measure (dBμV)
QP	64.6	54.6
AV	54.6	48.7



Phase : N

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

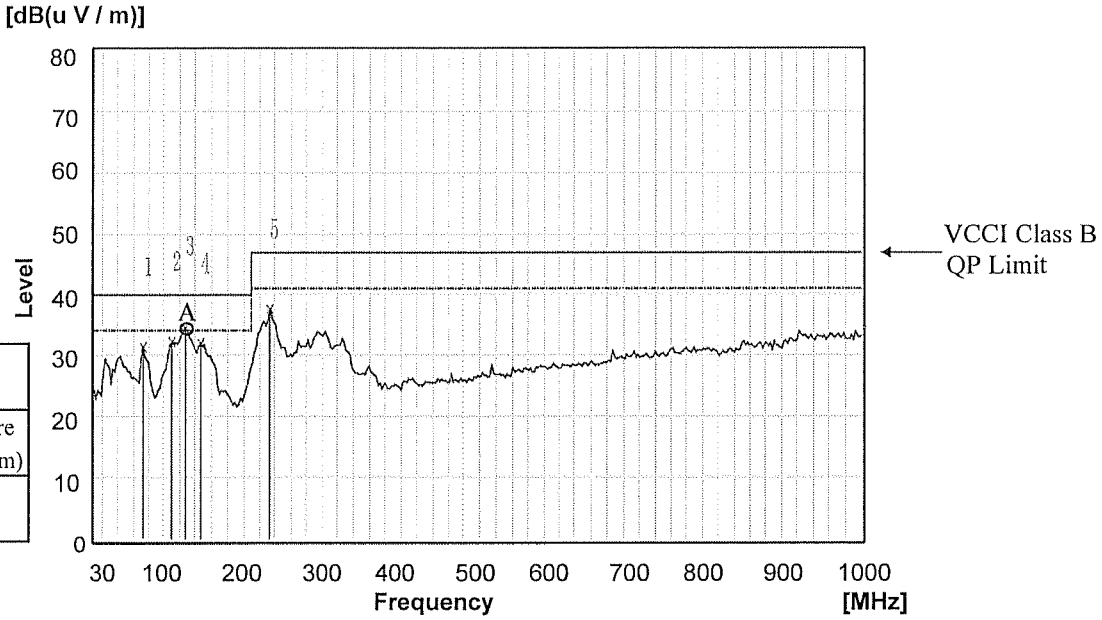
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 115VAC
Iout : 100%

Radiated Emission

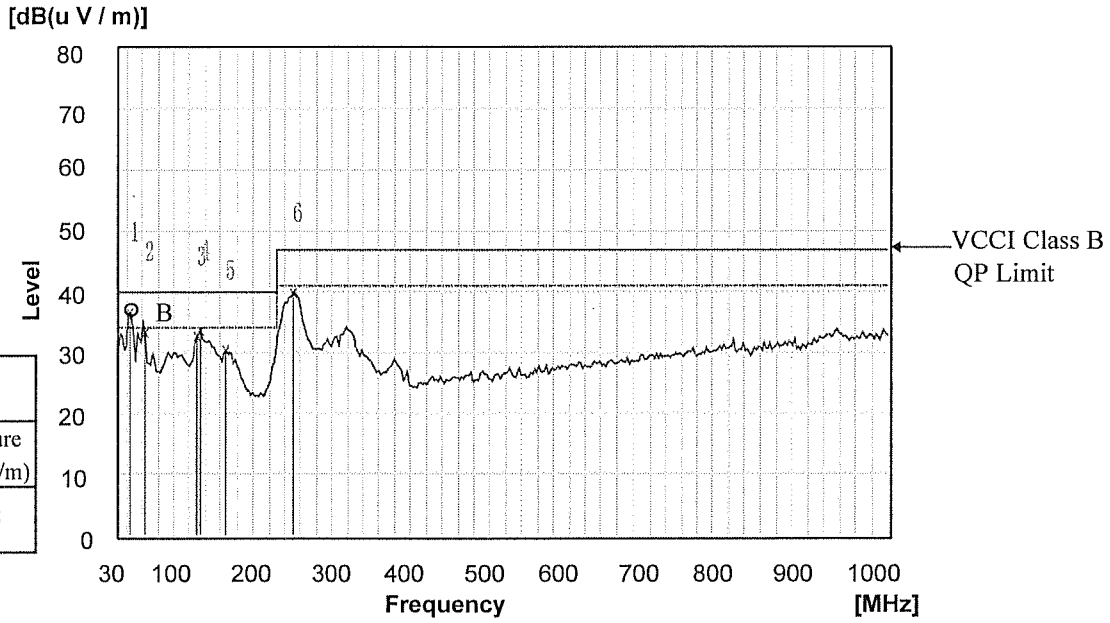
3V

HORIZONTAL



Point A (146.4MHz)	
Limit (dBµV/m)	Measure (dBµV/m)
40.0	34.5

VERTICAL



Point B (44.6MHz)	
Limit (dBµV/m)	Measure (dBµV/m)
40.0	36.5

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

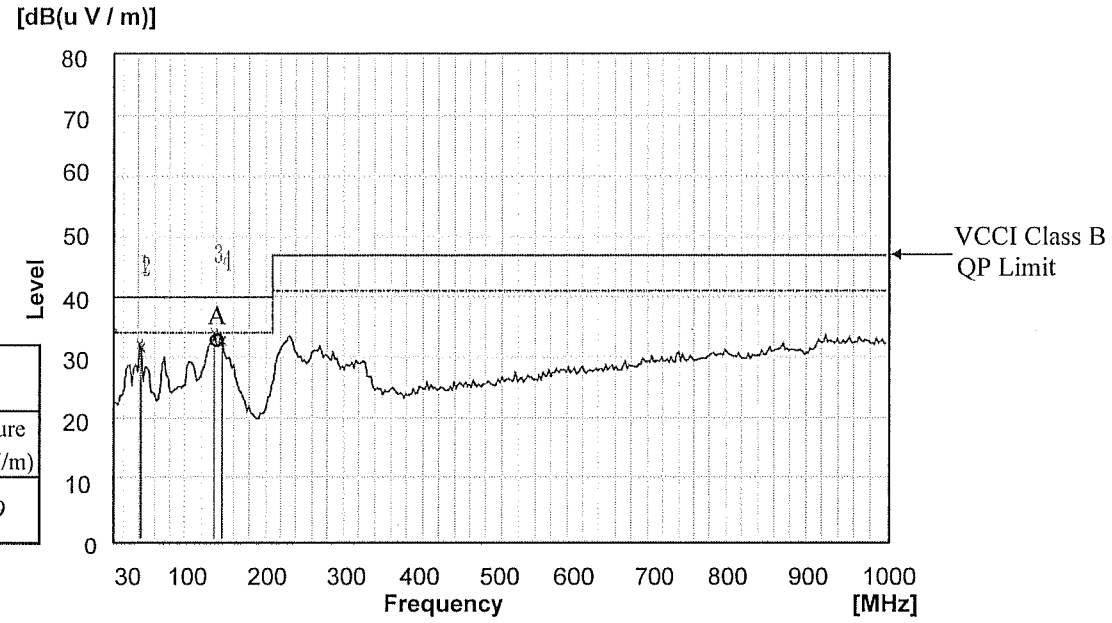
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 230VAC
Iout : 100%

Radiated Emission

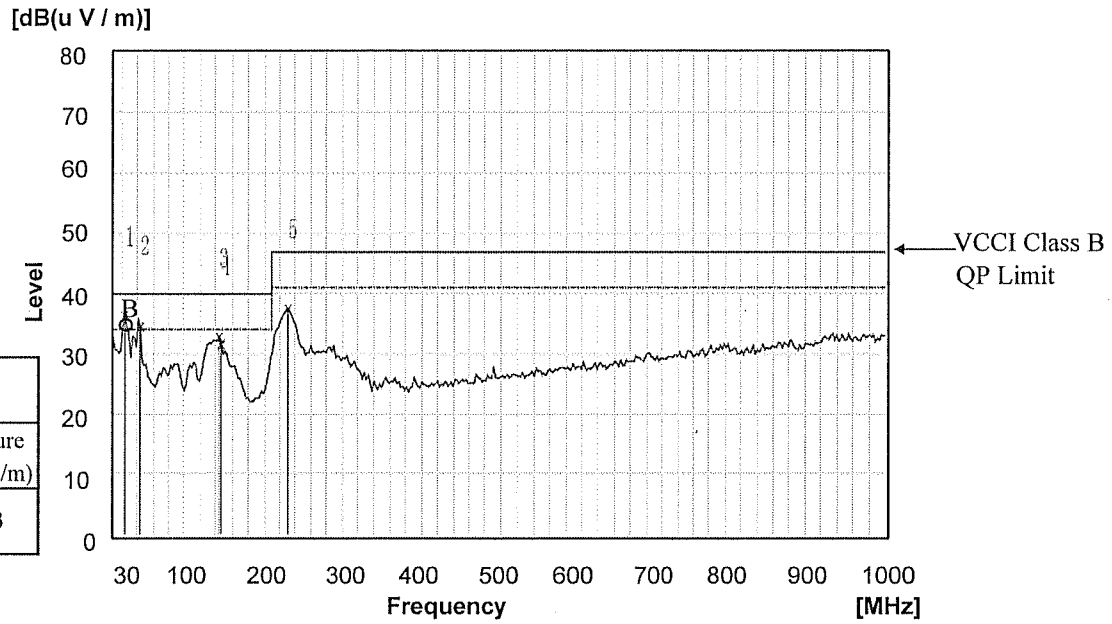
3V

HORIZONTAL



Point A (156.1MHz)	
Limit (dBμV/m)	Measure (dBμV/m)
40.0	33.9

VERTICAL



Point B (32.0MHz)	
Limit (dBμV/m)	Measure (dBμV/m)
44.6	36.3

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

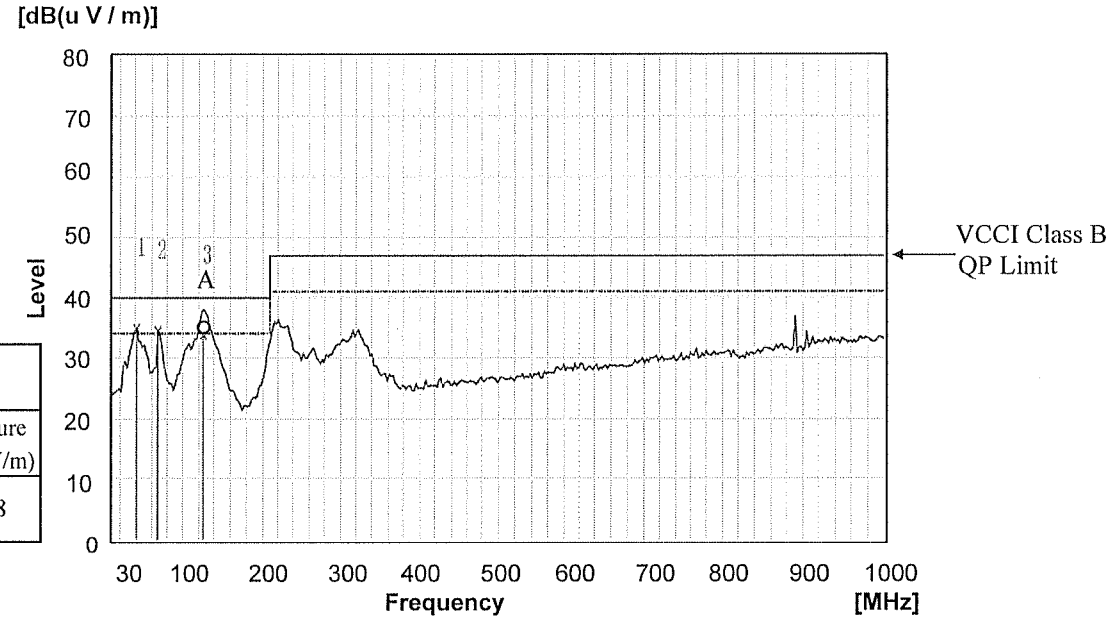
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 115VAC
Iout : 100%

Radiated Emission

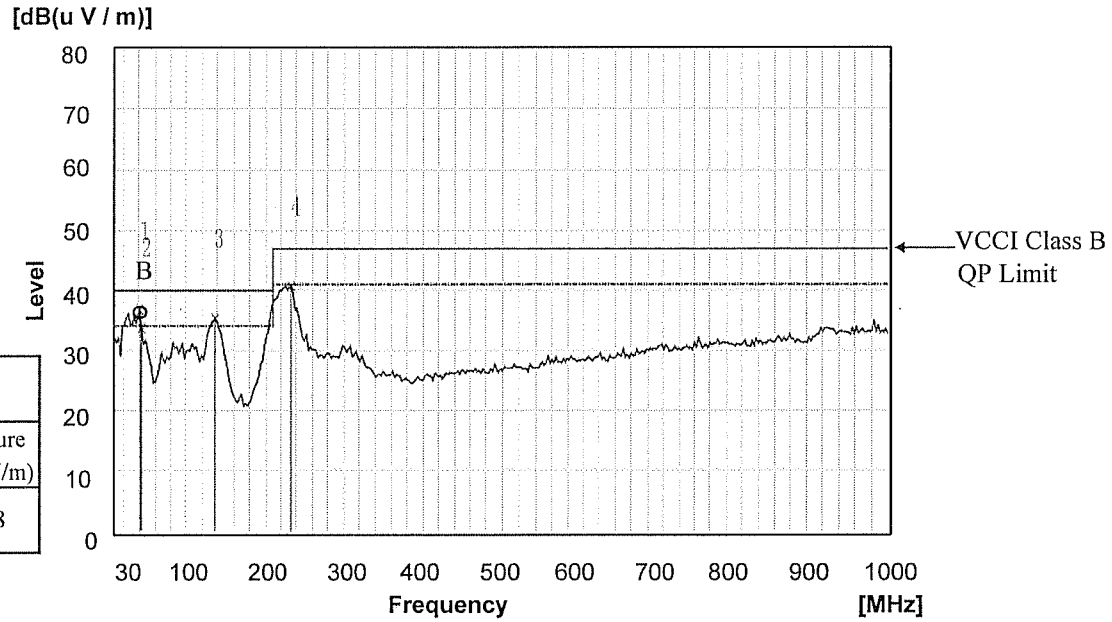
4V

HORIZONTAL



Point A (145.0MHz)	
Limit (dBμV/m)	Measure (dBμV/m)
40.0	33.8

VERTICAL



Point B (61.5MHz)	
Limit (dBμV/m)	Measure (dBμV/m)
40.0	36.8

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

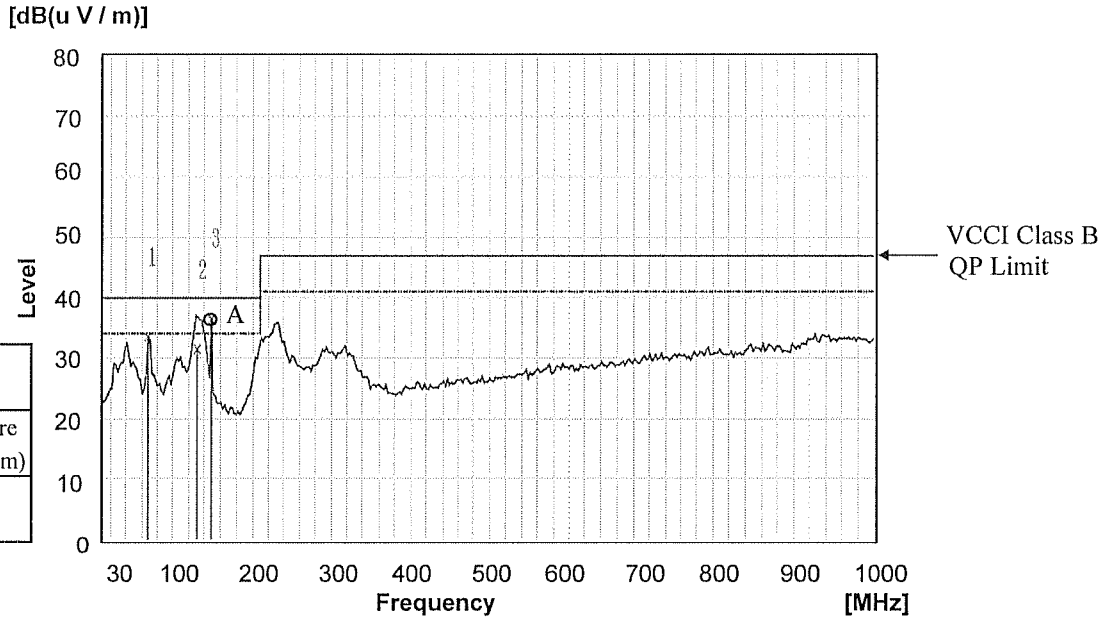
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 230VAC
Iout : 100%

Radiated Emission

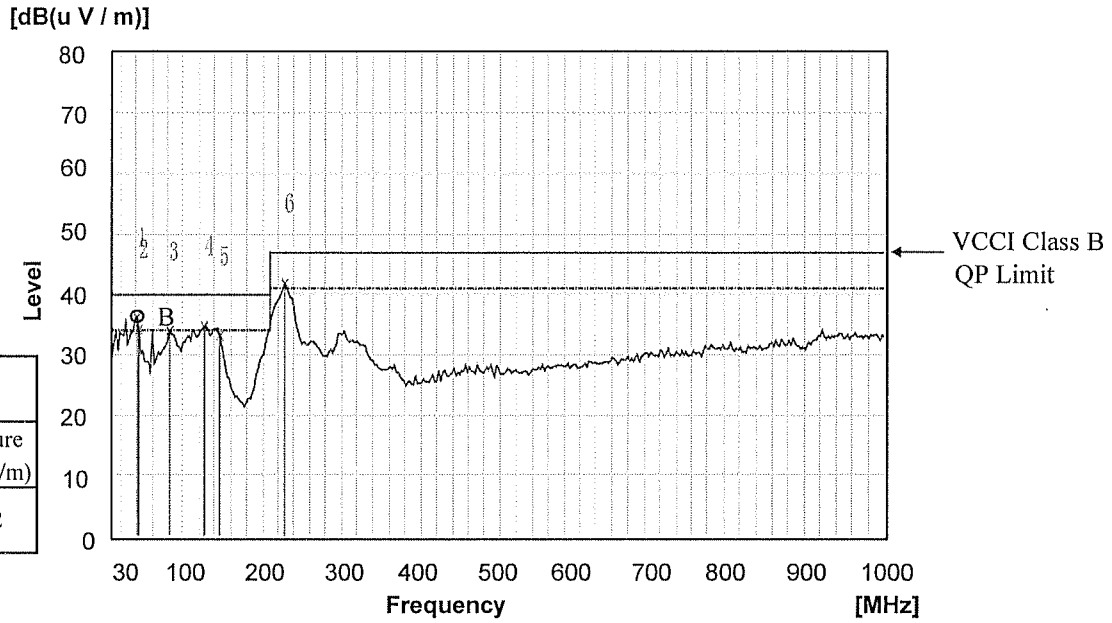
4V

HORIZONTAL



Point A (168.2MHz)	
Limit (dBμV/m)	Measure (dBμV/m)
40.0	36.4

VERTICAL



Point B (61.5MHz)	
Limit (dBμV/m)	Measure (dBμV/m)
40.0	36.2

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

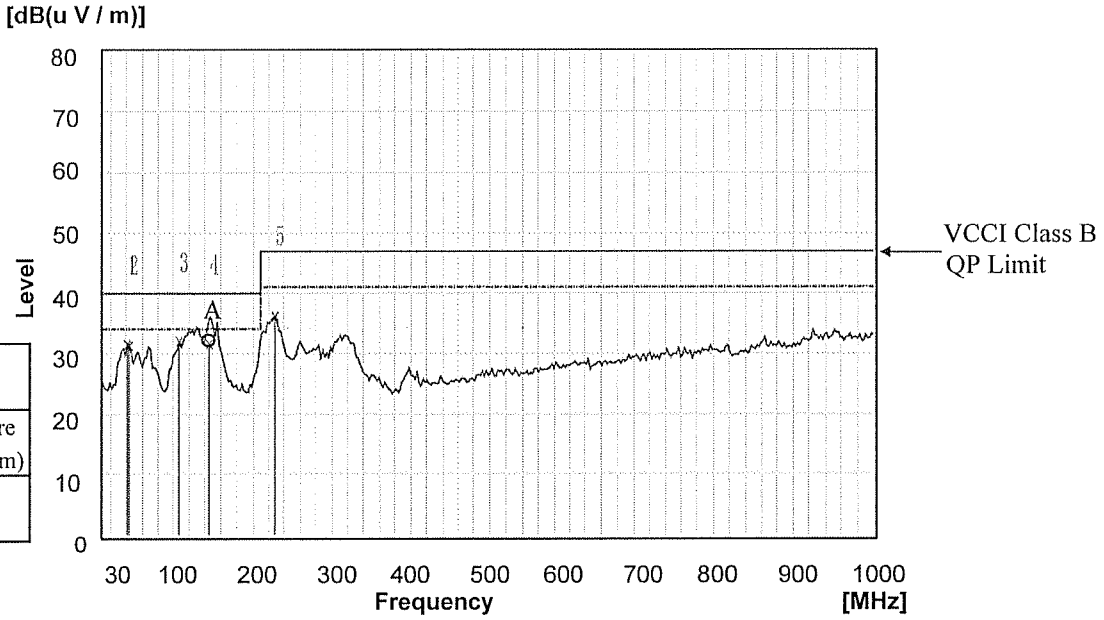
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 115VAC
Iout : 100%

Radiated Emission

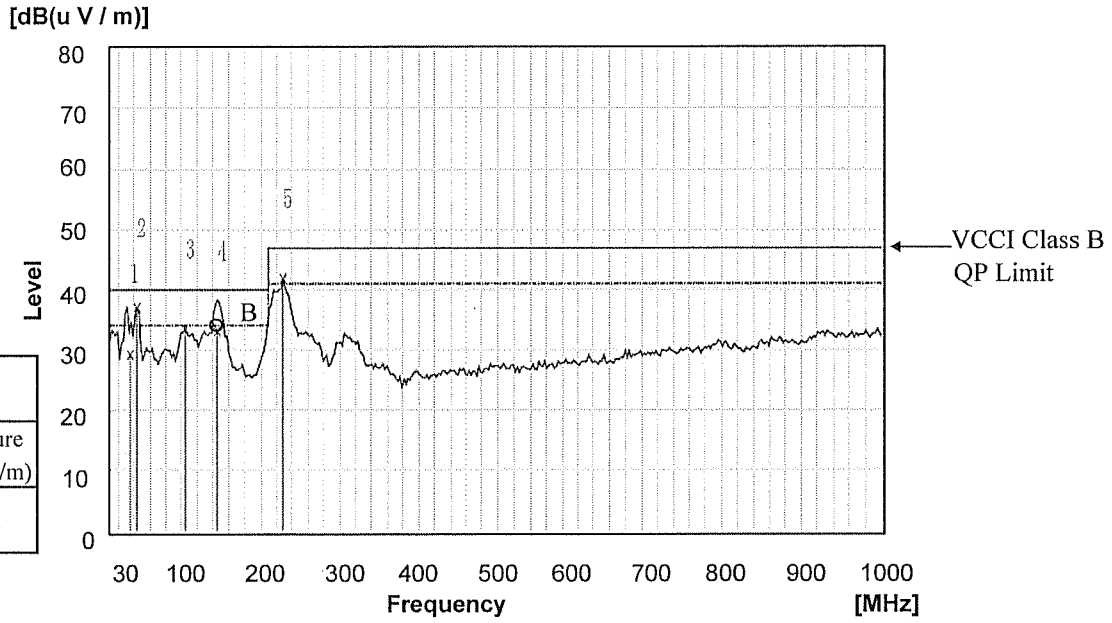
5V

HORIZONTAL



Point A (165.2MHz)	
Limit (dBµV/m)	Measure (dBµV/m)
40.0	31.5

VERTICAL



Point B (165.5MHz)	
Limit (dBµV/m)	Measure (dBµV/m)
40.0	33.1

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

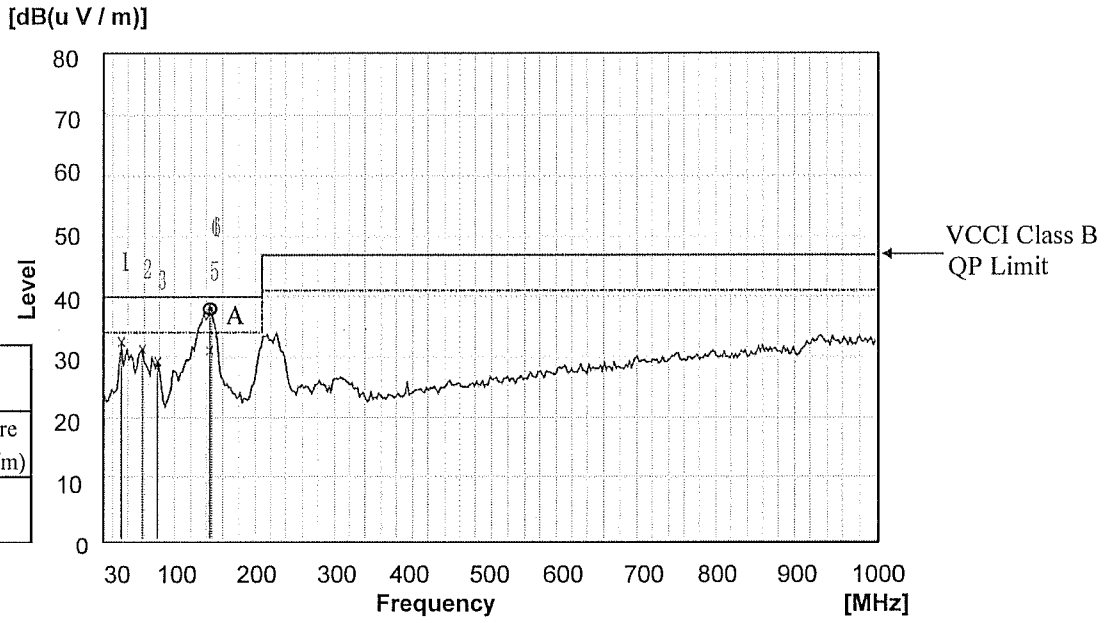
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 230VAC
Iout : 100%

Radiated Emission

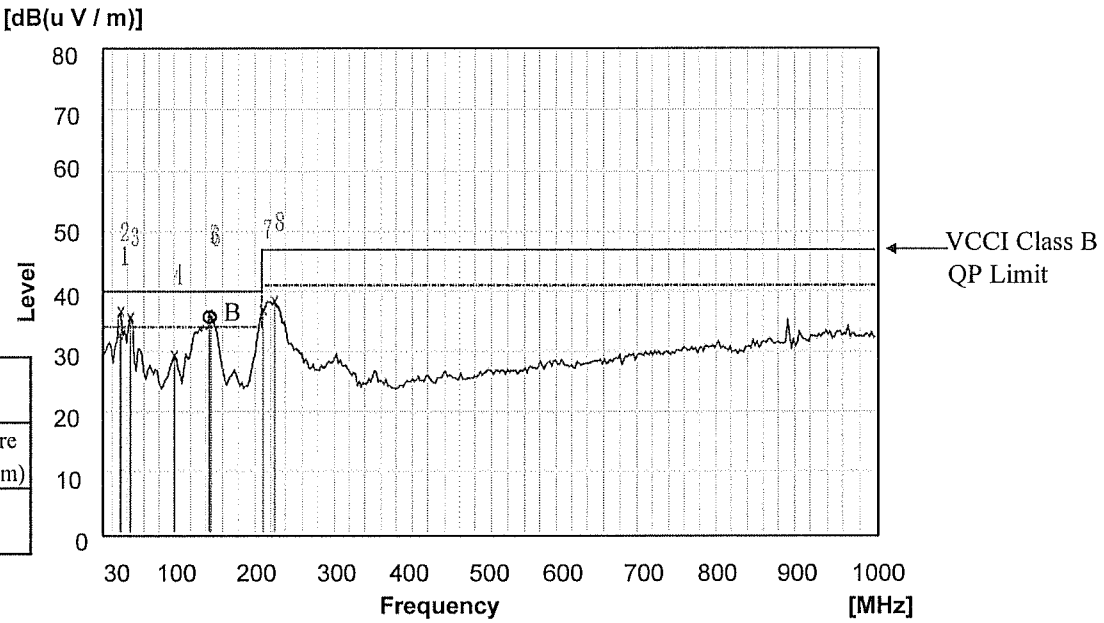
5V

HORIZONTAL



Point A (163.6MHz)	
Limit (dBμV/m)	Measure (dBμV/m)
40.0	31.1

VERTICAL



Point B (163.4MHz)	
Limit (dBμV/m)	Measure (dBμV/m)
40.0	36.3

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

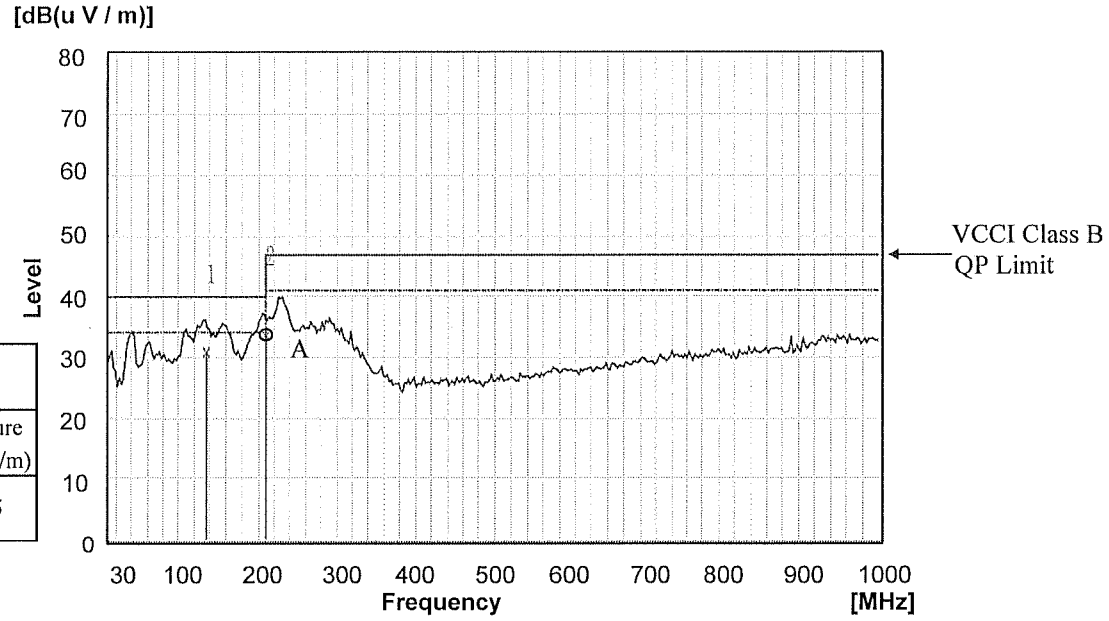
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 115VAC
Iout : 100%

Radiated Emission

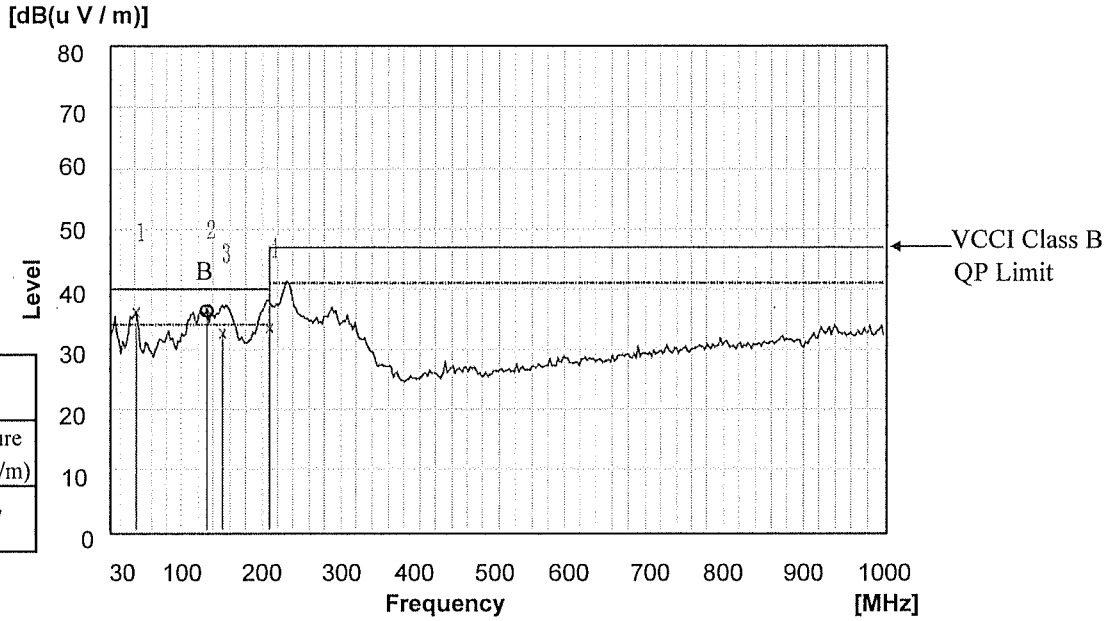
12V

HORIZONTAL



Point A (229.9MHz)	
Limit (dBµV/m)	Measure (dBµV/m)
40.0	33.5

VERTICAL



Point B (151.3MHz)	
Limit (dBµV/m)	Measure (dBµV/m)
40.0	36.7

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

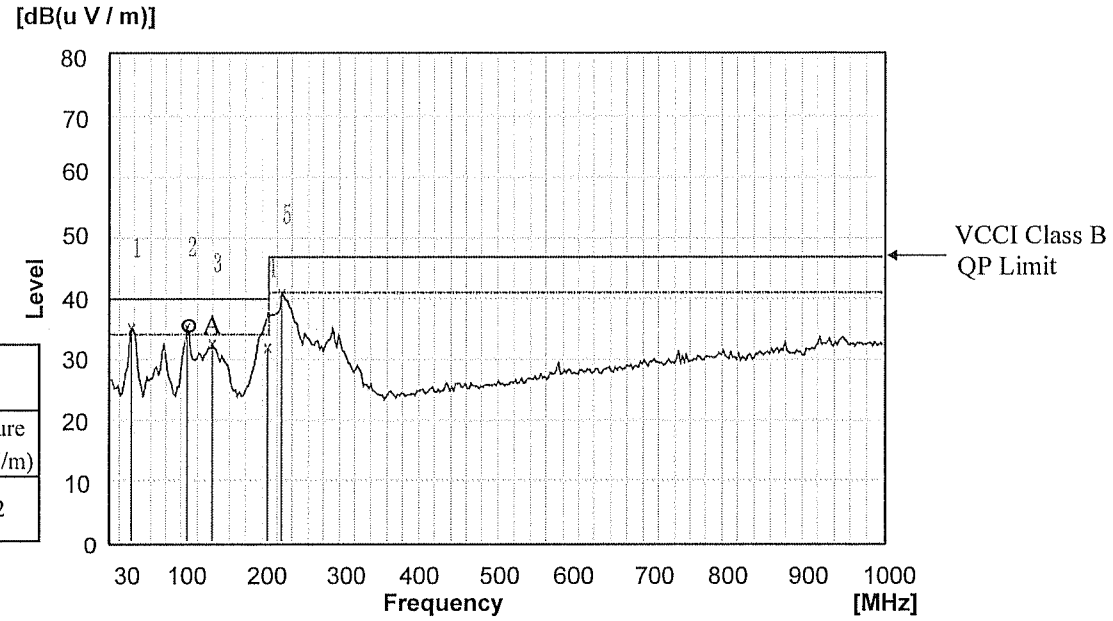
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 230VAC
Iout : 100%

Radiated Emission

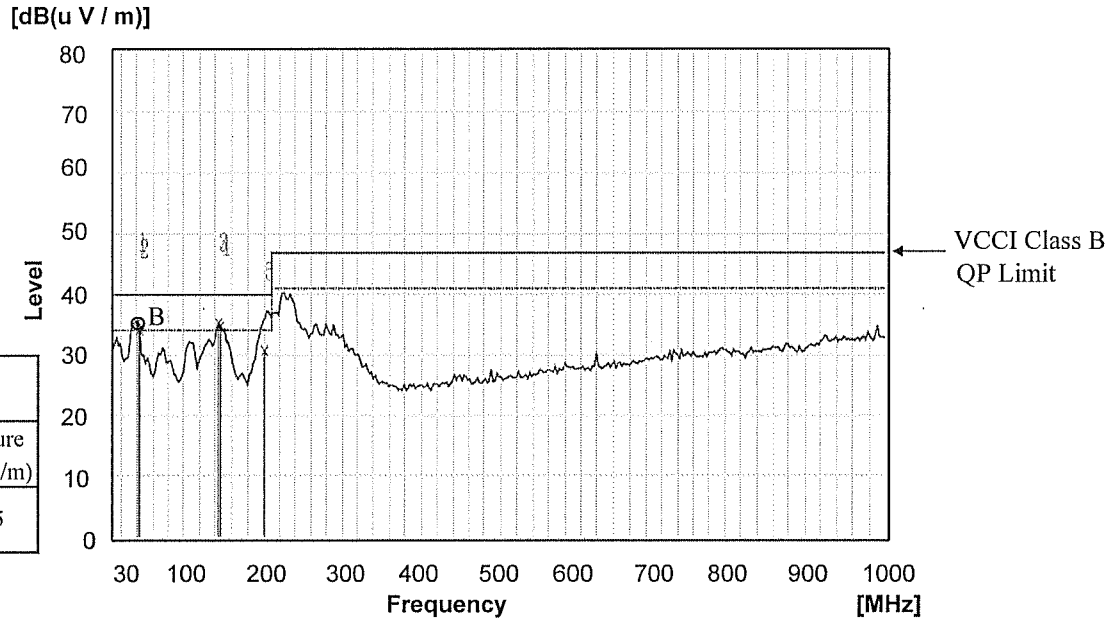
12V

HORIZONTAL



Point A (127.0MHz)	
Limit (dBµV/m)	Measure (dBµV/m)
40.0	35.2

VERTICAL



Point B (61.5MHz)	
Limit (dBµV/m)	Measure (dBµV/m)
40.0	35.5

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

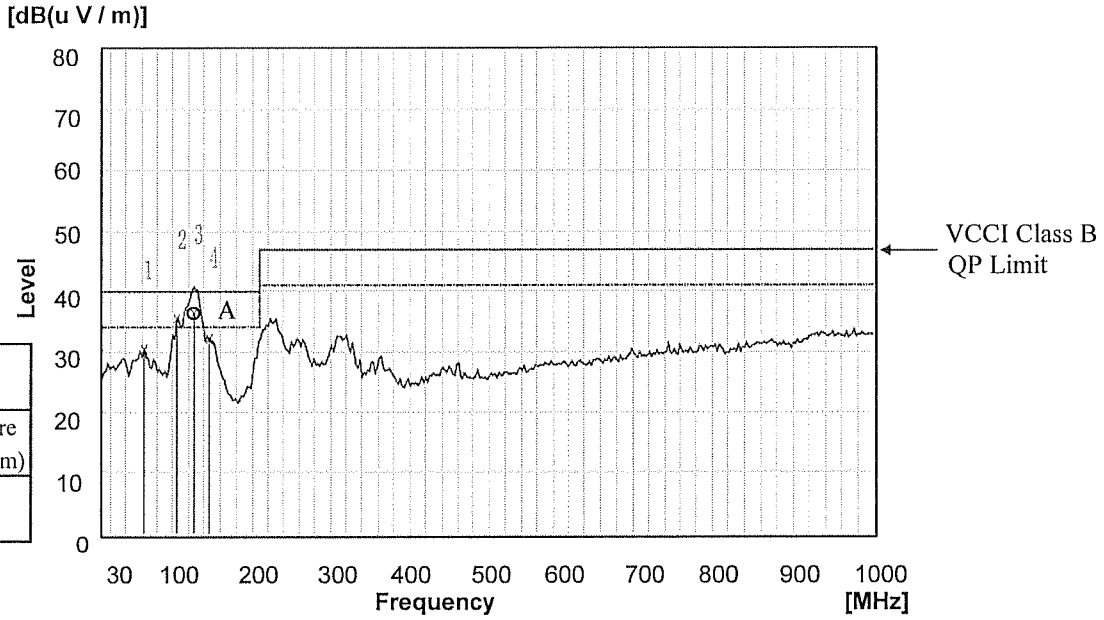
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 115VAC
Iout : 100%

Radiated Emission

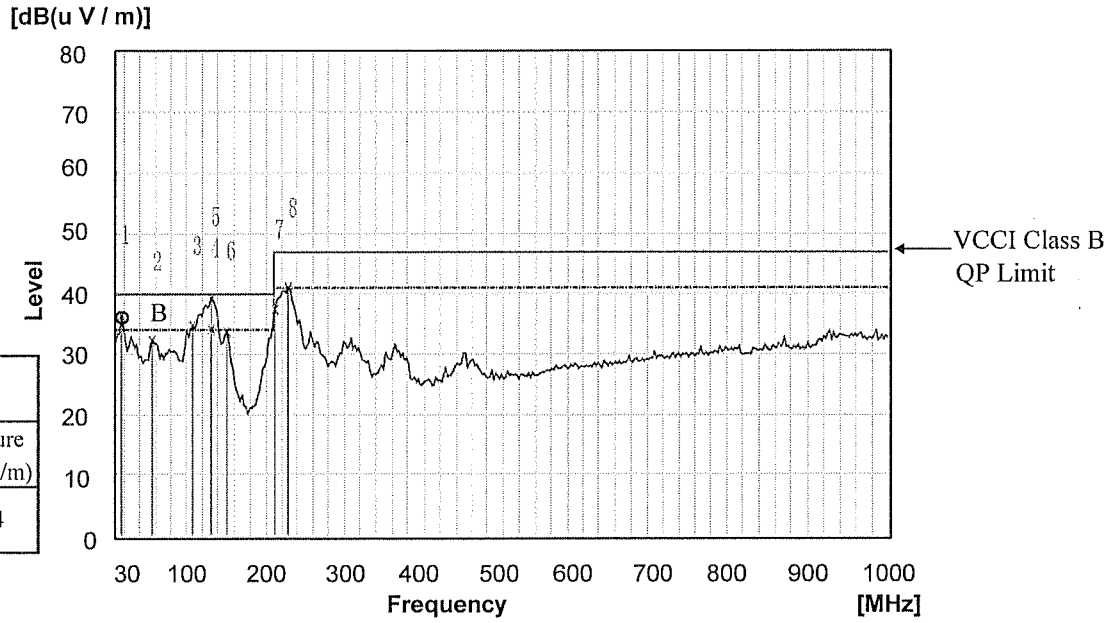
24V

HORIZONTAL



Point A (146.5MHz)	
Limit (dBμV/m)	Measure (dBμV/m)
40.0	36.3

VERTICAL



Point B (37.3MHz)	
Limit (dBμV/m)	Measure (dBμV/m)
40.0	36.4

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.

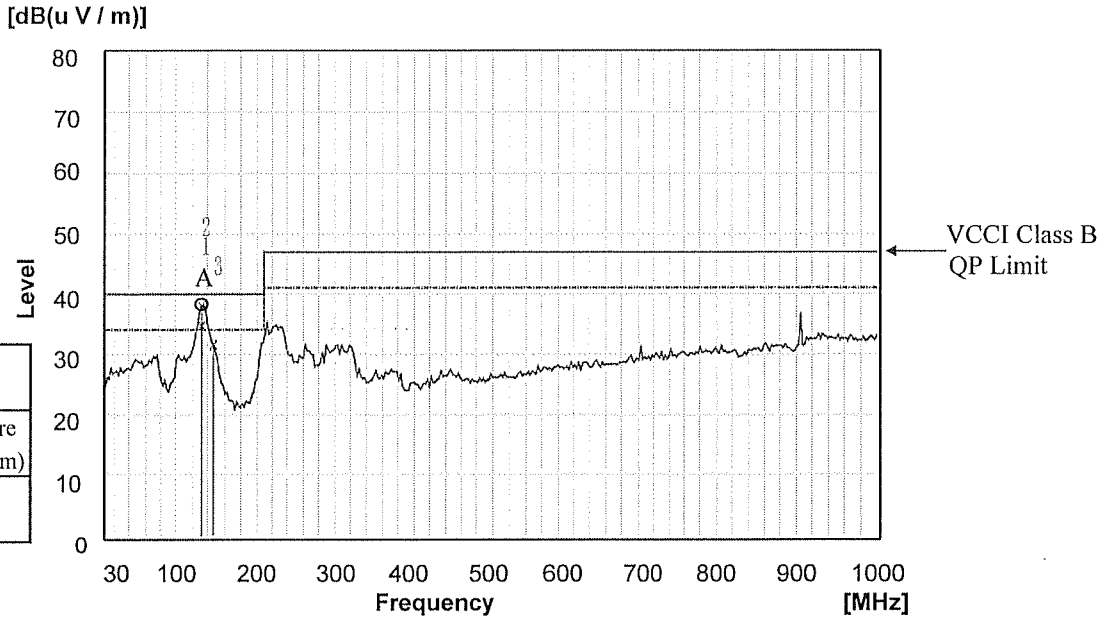
2.15 Electro-Magnetic Interference characteristics

Conditions: Vin : 230VAC
Iout : 100%

Radiated Emission

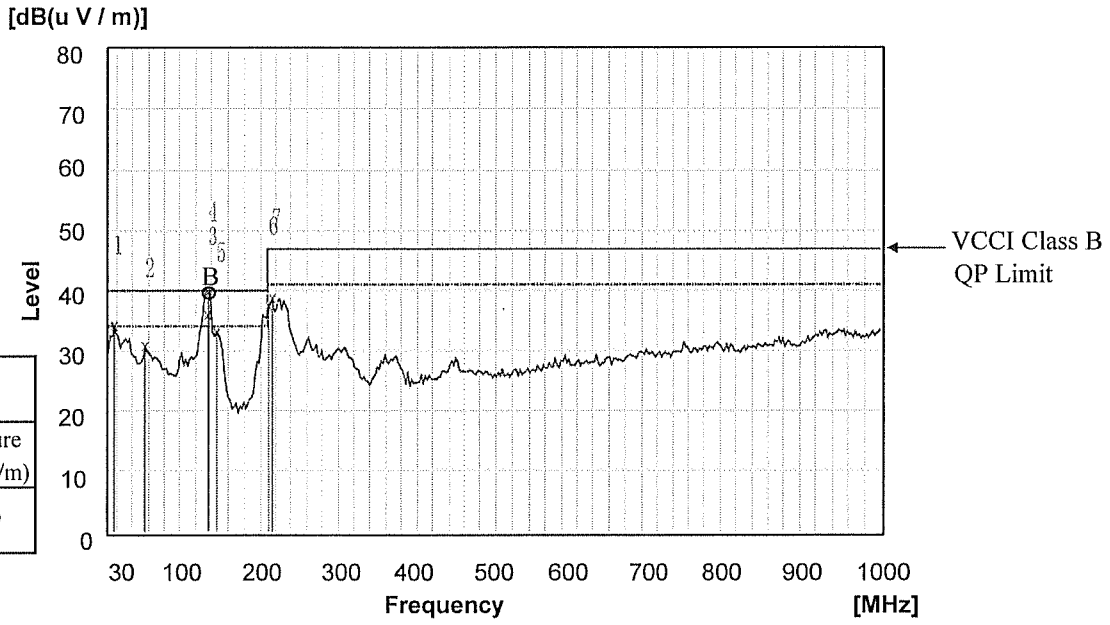
24V

HORIZONTAL



Point A (151.0MHz)	
Limit (dBμV/m)	Measure (dBμV/m)
40.0	34.7

VERTICAL



Point B (154.6MHz)	
Limit (dBμV/m)	Measure (dBμV/m)
40.0	35.9

Limit of EN55011-B,EN55022-B are same as its VCCI Class B.