RDS50-110

EVALUATION DATA

型式データ

DWG No. B043-53-01		
APPD	CHK	DWG
N. Uesono	Y. Kuwasawa	Y. Takeuchi
17, Jan, '12	13, Jan, '12	13, Jan, '12

INDEX

略称記号説明　Abbreviation Symbol Description

Vin	入力電圧	Input voltage
Vo	出力電圧	Output voltage
Iin	入力電流	Input current
Io	出力電流	Output current
Ta	周囲温度	Ambient temperature
f	周波数	Frequency
CNT (RC)	ON/OFF制御	ON/OFF control

1. 測定方法　Evaluation Method

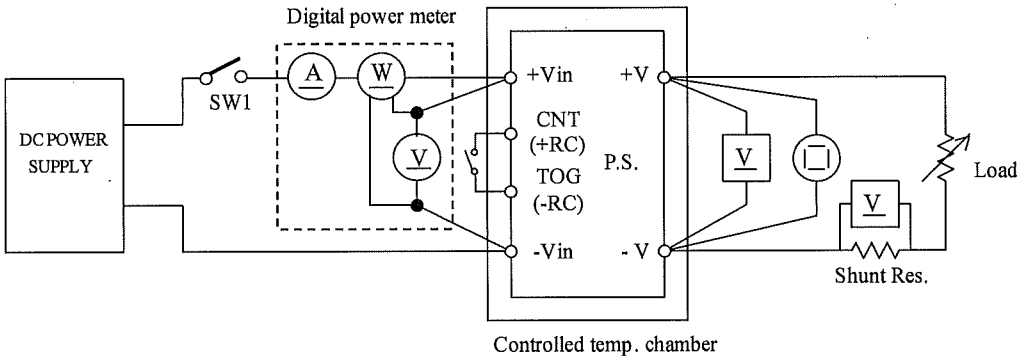
1.1　測定回路　Measurement Circuit

測定回路 1

- 静特性
- 過電流保護特性
- 過電圧保護特性
- 出力立ち上がり・立ち下がり特性
- 出力保持時間特性

Measurement Circuit 1

- Steady state data
- Over current protection (OCP) characteristics
- Over voltage protection (OVP) characteristics
- Output rise and fall characteristics
- Hold up time characteristics

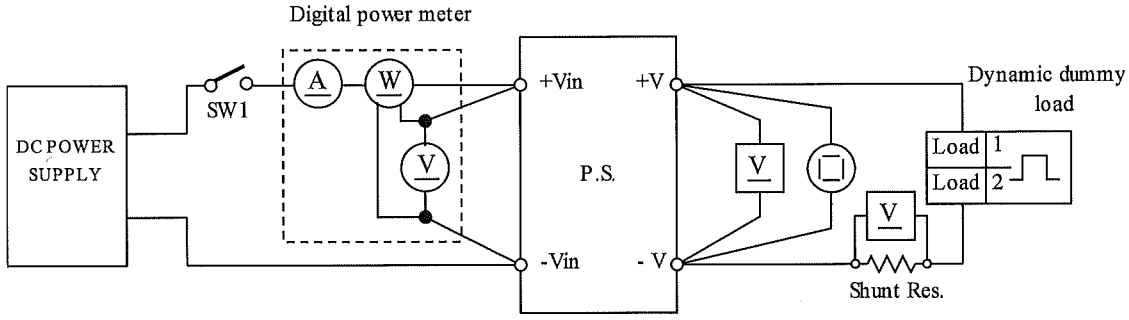


測定回路 2

- 過渡応答（負荷急変）特性

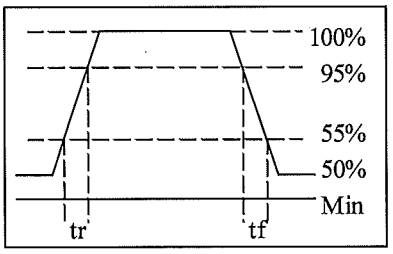
Measurement Circuit 2

- Dynamic load response characteristics



Output current waveform

Iout 50% <=> 100%

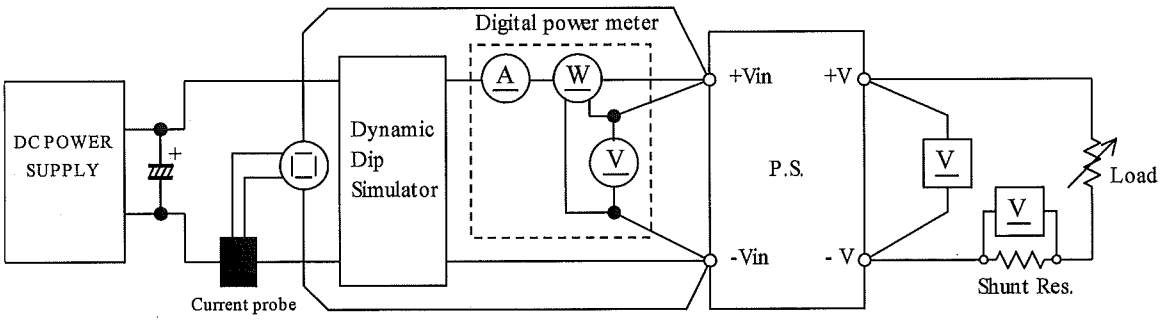


測定回路 3

- 入力サージ電流（突入電流）特性

Measurement Circuit 3

- Inrush current characteristics

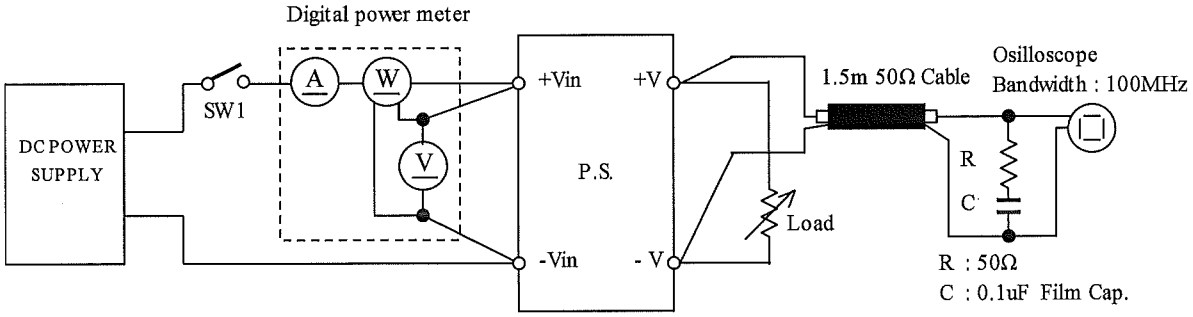


測定回路 4

・出力リップル、ノイズ波形

Measurement Circuit 4

Output ripple and noise waveform



測定構成図

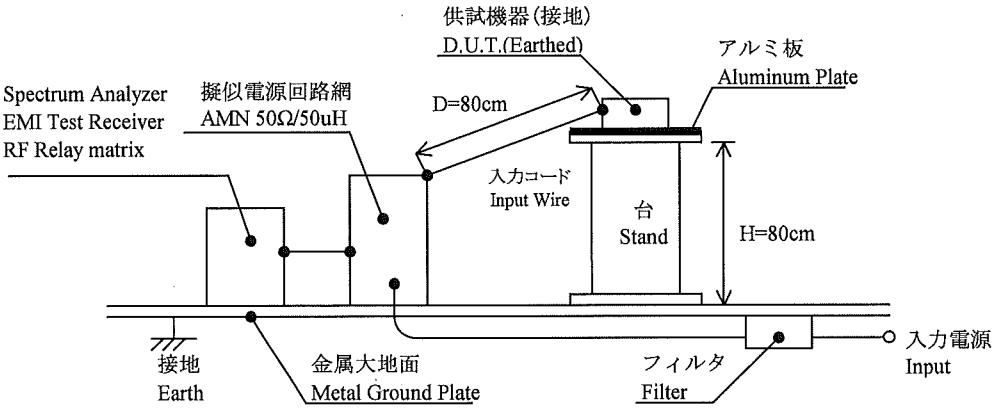
・EMI特性

雑音端子電圧（帰還ノイズ）

Configuration used for determination

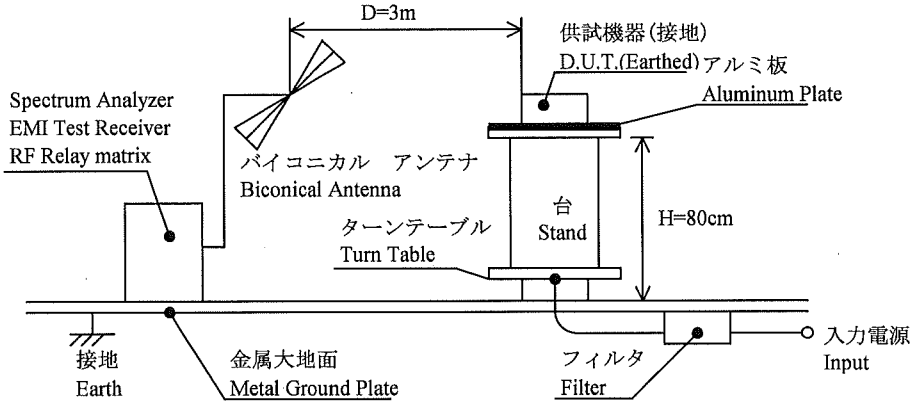
Electro-Magnrtic Interference characteristics

Conducted Emission



雑音電界強度（輻射ノイズ）

Radiated Emission



1.2 使用測定機器　List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECTRIC	DL1740EL
2	DIGITAL MULTIMETER	AGILENT	34970A
3	DIGITAL POWER METER	YOKOGAWA ELECTRIC	WT110
4	CURRENT PROBE/AMPLIFIER	YOKOGAWA ELECTRIC	701932
5	CURRENT PROBE/AMPLIFIER	TEKTRONIX	A6303
6	DUMMY LOAD	TAKASAGO	FK-400L
7	CVCF (AC/DC POWER SUPPLY)	KIKUSUI	PCR4000L
8	DYNAMIC DIP SIMULATOR	TAKAMIZAWA	PSA-210
9	CONTROLLED TEMP. CHAMBER	ESPEC	SU-240
10	SPECTRUM ANALYZER EMI TEST RECEIVER	ROHDE & SCHWARZ	ESCI
11	RF SELECTOR	TOYO CORPOLATION	NS4900
12	AMN	SCHWARZBECK	NNLK8121
13	ANTENNA (BICONICAL ANTENNA)	TESEQ	CBL6111D

2. 特性データ　　Characteristics Data

2. 1 静特性　　Steady state data

(1) 入力・負荷・温度変動
Regulation - Line and Load , Temperature drift

1. Regulation - Line and Load　　Condition : Ta=25℃

5V

Io \ Vin	60VDC	110VDC	160VDC	Line regulation	
0%	5.004V	5.005V	5.005V	1mV	0.020%
50%	5.002V	5.002V	5.002V	0mV	0.000%
100%	5.000V	5.000V	4.999V	1mV	0.020%
Load	4mV	5mV	6mV		
regulation	0.080%	0.100%	0.120%		

12V

Io \ Vin	60VDC	110VDC	160VDC	Line regulation	
0%	12.014V	12.014V	12.014V	0mV	0.000%
50%	12.014V	12.013V	12.013V	1mV	0.008%
100%	12.013V	12.013V	12.012V	1mV	0.008%
Load	1mV	1mV	2mV		
regulation	0.008%	0.008%	0.017%		

15V

Io \ Vin	60VDC	110VDC	160VDC	Line regulation	
0%	14.995V	14.996V	14.996V	1mV	0.007%
50%	14.994V	14.995V	14.995V	1mV	0.007%
100%	14.994V	14.994V	14.994V	0mV	0.000%
Load	1mV	2mV	2mV		
regulation	0.007%	0.013%	0.013%		

24V

Io \ Vin	60VDC	110VDC	160VDC	Line regulation	
0%	23.994V	23.994V	23.995V	1mV	0.004%
50%	23.993V	23.994V	23.994V	1mV	0.004%
100%	23.993V	23.994V	23.994V	1mV	0.004%
Load	1mV	0mV	1mV		
regulation	0.004%	0.000%	0.004%		

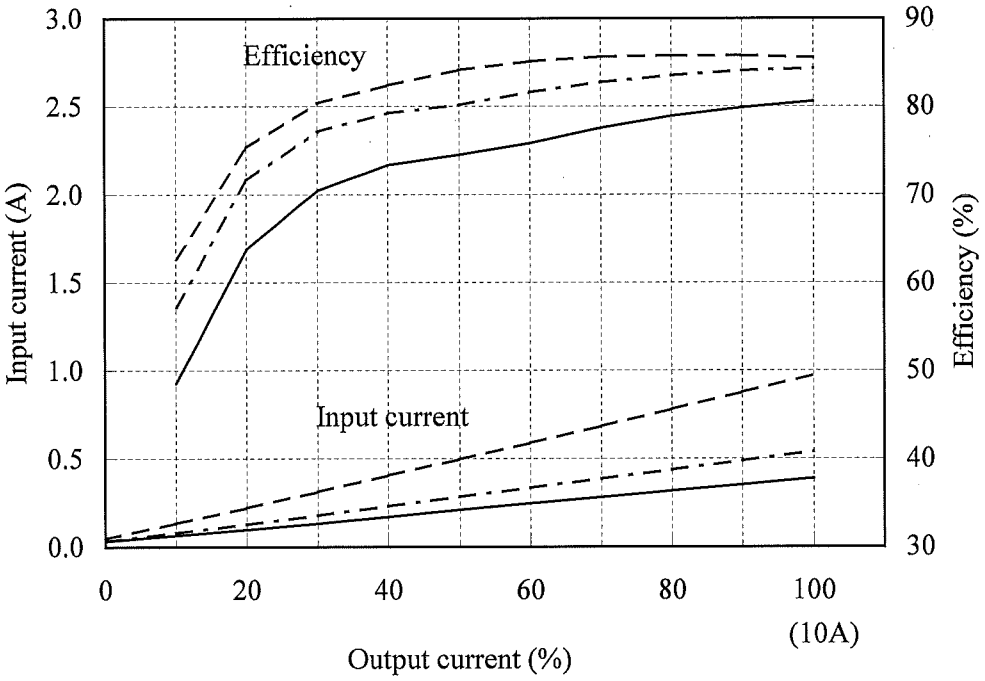
2. Temperature drift　　Conditions : Vin=110VDC, Iout=100%

	Ta	-20℃	+25℃	+71℃	Temperature stability	
5V	Vo	5.005V	5.000V	4.998V	7mV	0.140%
12V	Vo	12.039V	12.013V	11.994V	45mV	0.375%
15V	Vo	15.033V	14.994V	14.970V	63mV	0.420%
24V	Vo	24.025V	23.994V	23.988V	37mV	0.154%

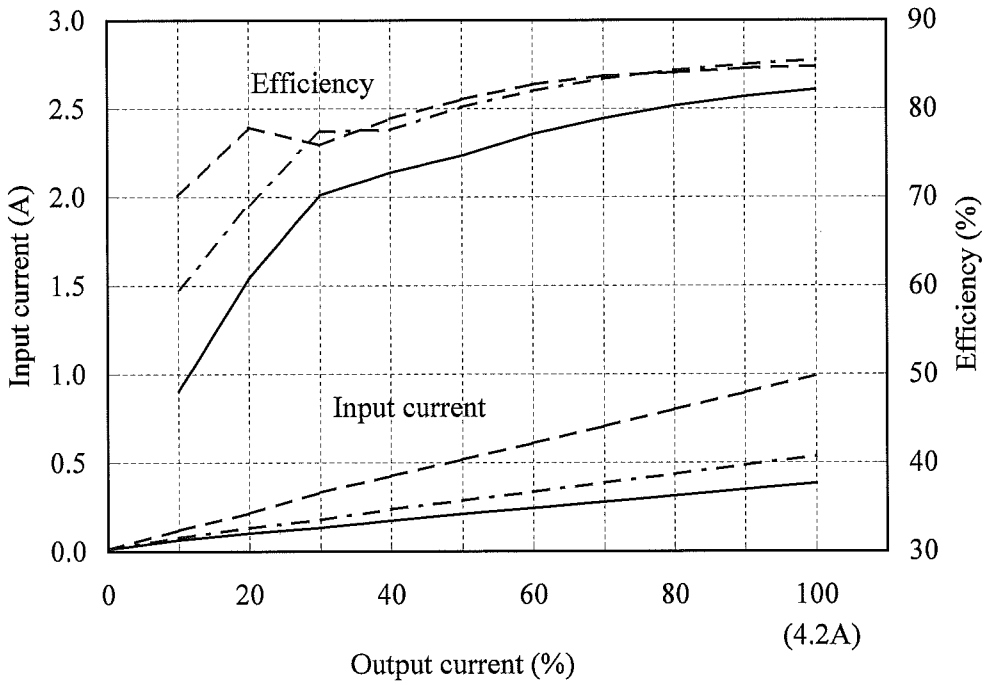
(2) 入力電流・効率 対 出力電流
Input current and Efficiency vs. Output current

Conditions Vin : 60 VDC
: 110 VDC
: 160 VDC
Ta : 25 ℃

5V



12V



(2) 入力電流・効率 対 出力電流
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Conditions Vin : 60 VDC
: 110 VDC
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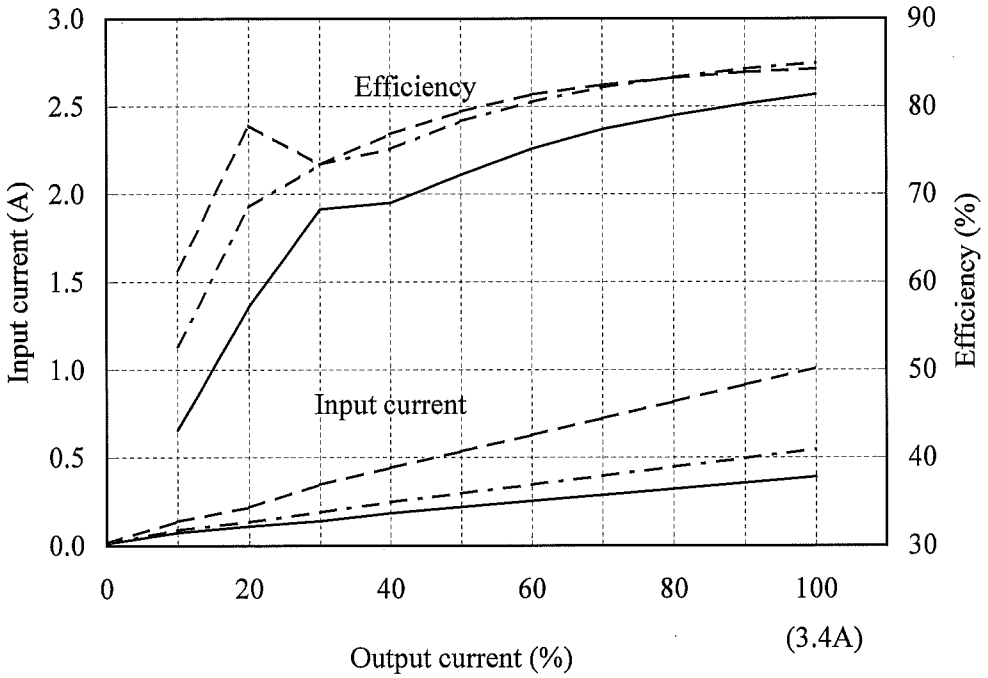
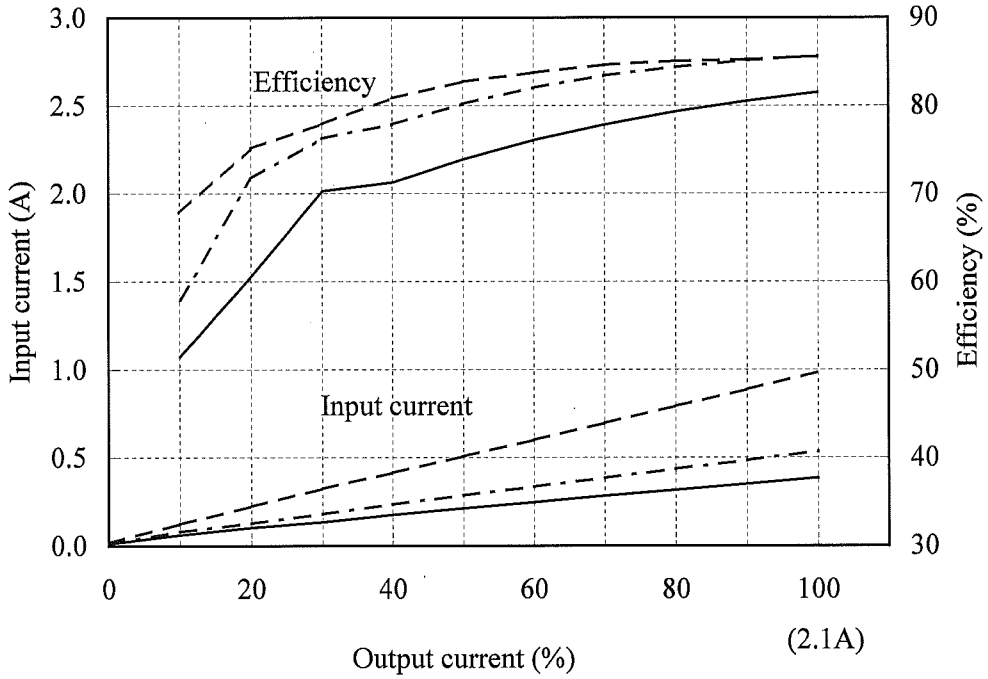
15V



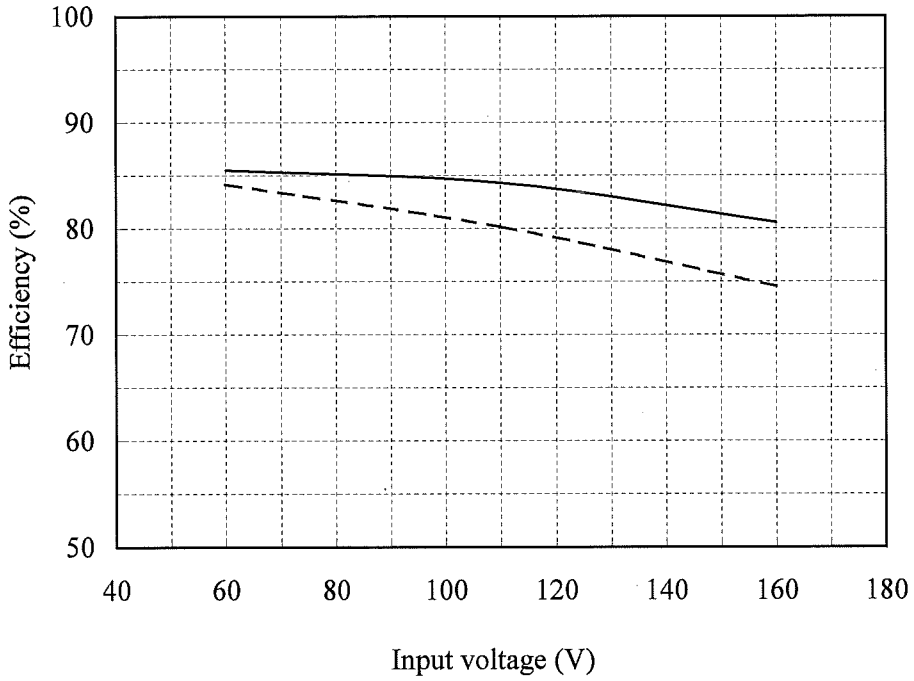
24V



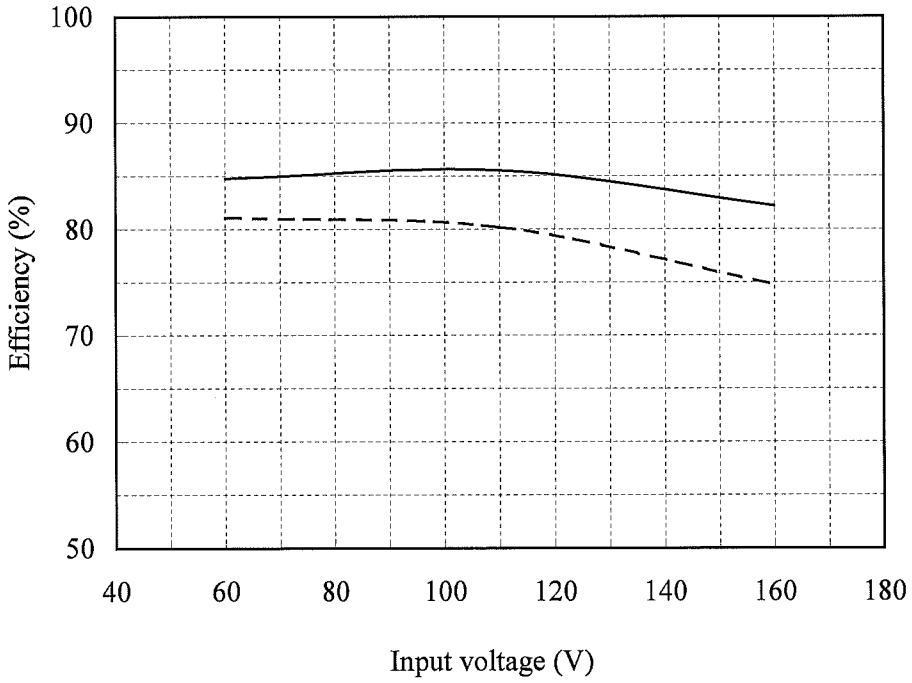
(3) 効率 対 入力電圧
Efficiency vs. Input voltage

Conditions Io : 50 % ----
: 100 % ——
Ta : 25 ℃

5V



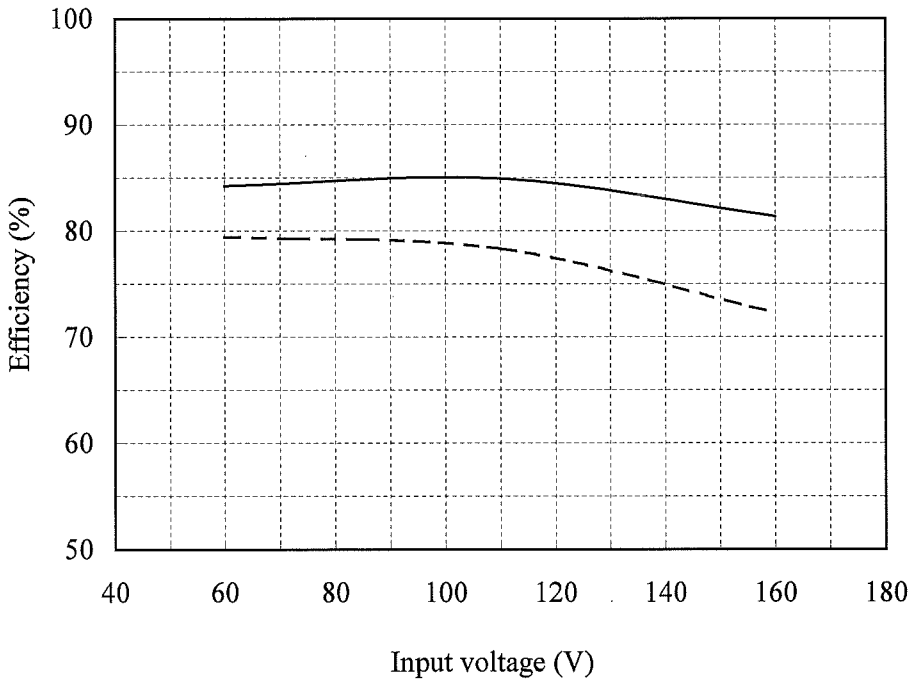
12V



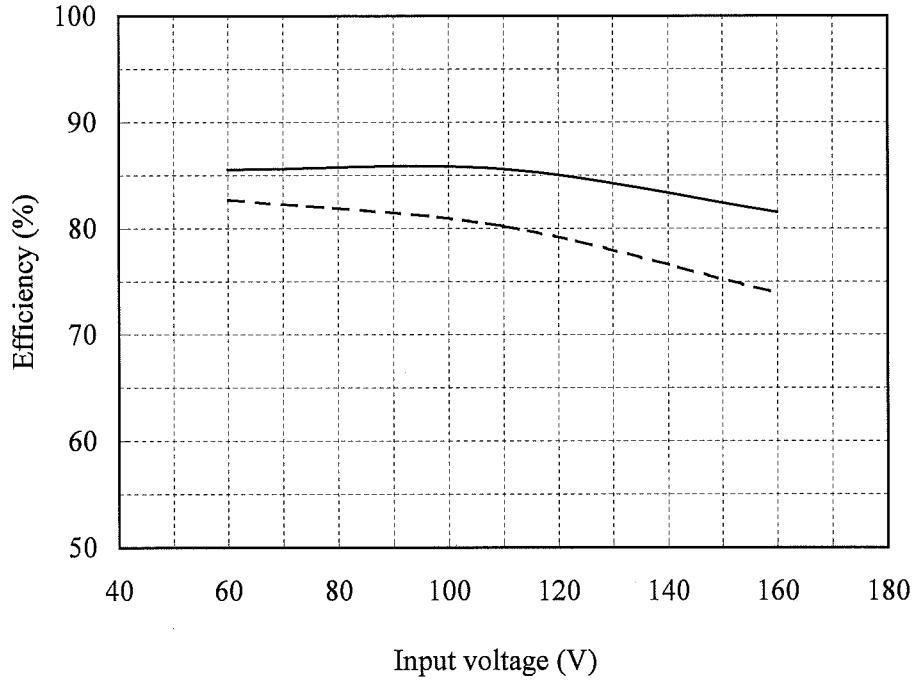
(3) 効率 対 入力電圧
Efficiency vs. Input voltage

Conditions Io : 50 % ----
: 100 % ——
Ta : 25 ℃

15V



24V



(4) 起動・停止電圧特性
Start and Stop voltage characteristics

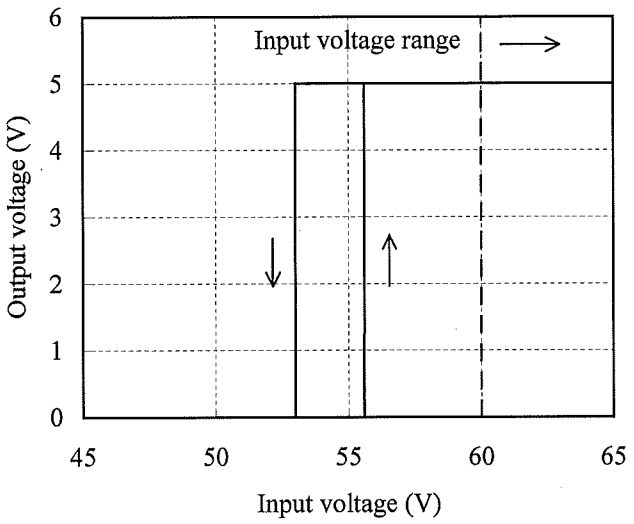
出力電圧 対 入力電圧
Output voltage vs. Input voltage

Conditions Io : 100 %
Ta : 25 ℃

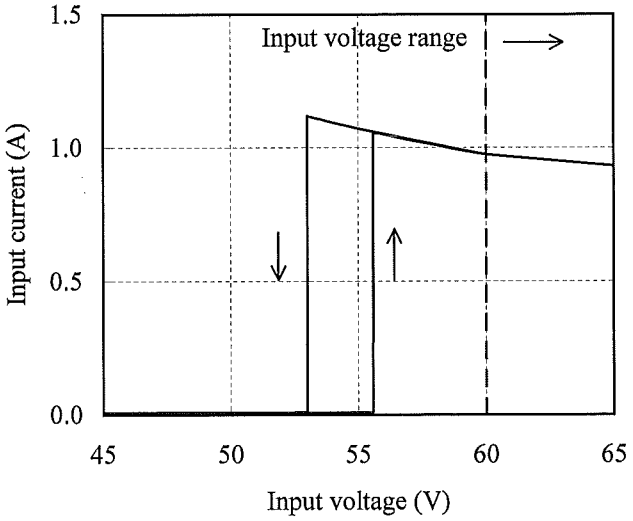
入力電流 対 入力電圧
Input current vs. Input voltage

Conditions Io : 100 %
Ta : 25 ℃

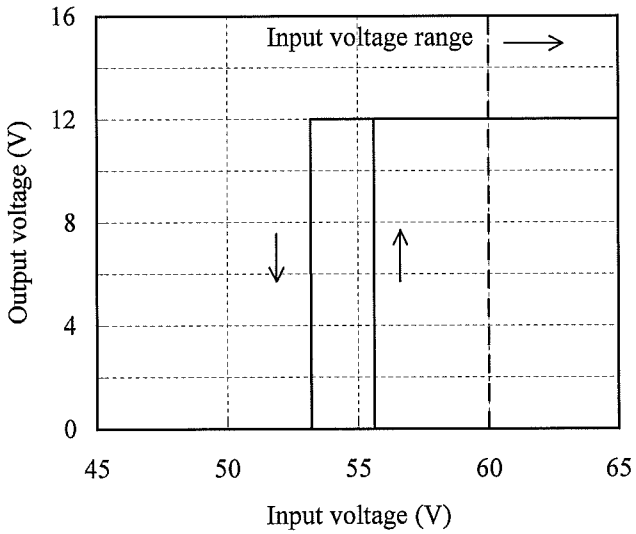
5V



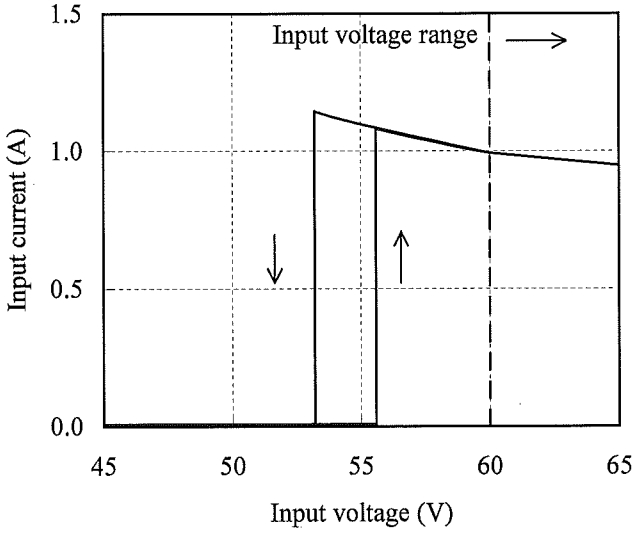
5V



12V



12V

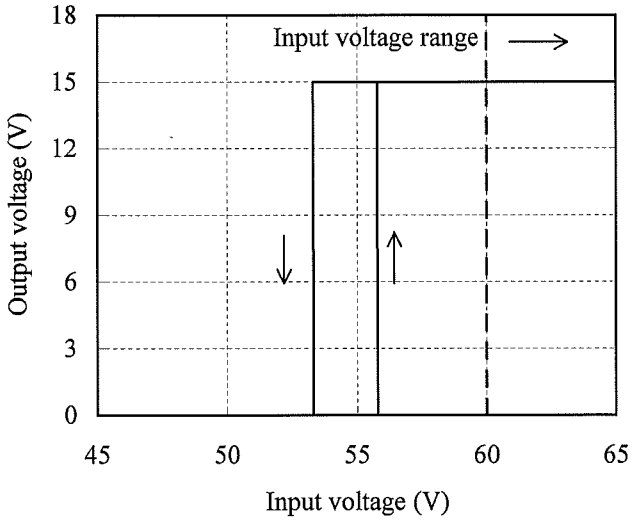


(4) 起動・停止電圧特性
Start and Stop voltage characteristics

出力電圧 対 入力電圧
Output voltage vs. Input voltage

Conditions Io : 100 %
Ta : 25 ℃

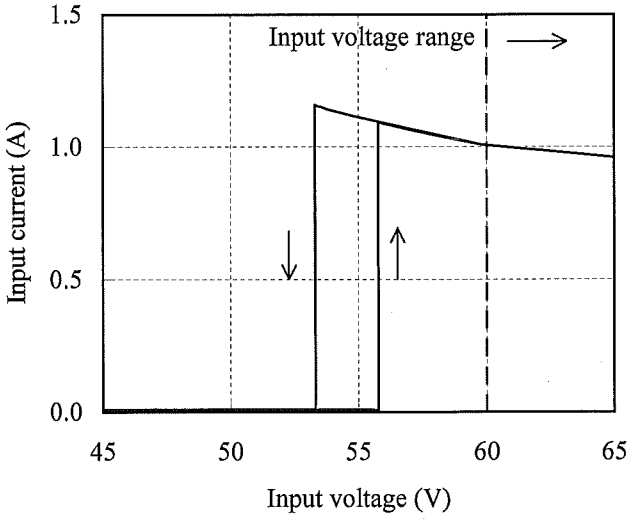
15V



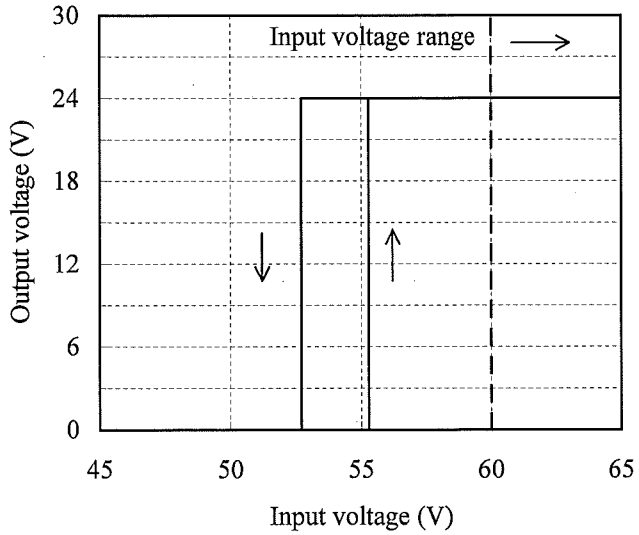
入力電流 対 入力電圧
Input current vs. Input voltage

Conditions Io : 100 %
Ta : 25 ℃

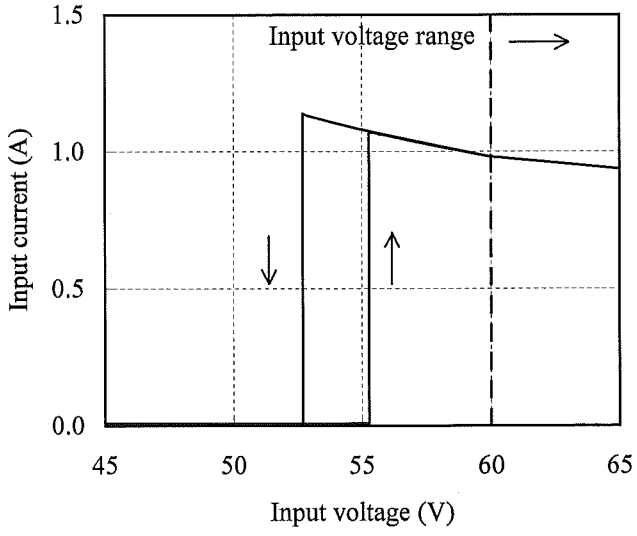
15V



24V



24V



2.2 過電流保護特性
Over current protection (OCP) characteristics

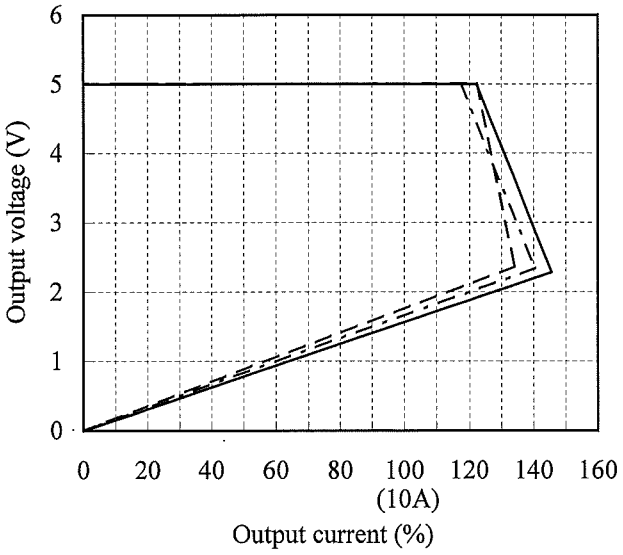
入力電圧依存性
Input voltage dependence

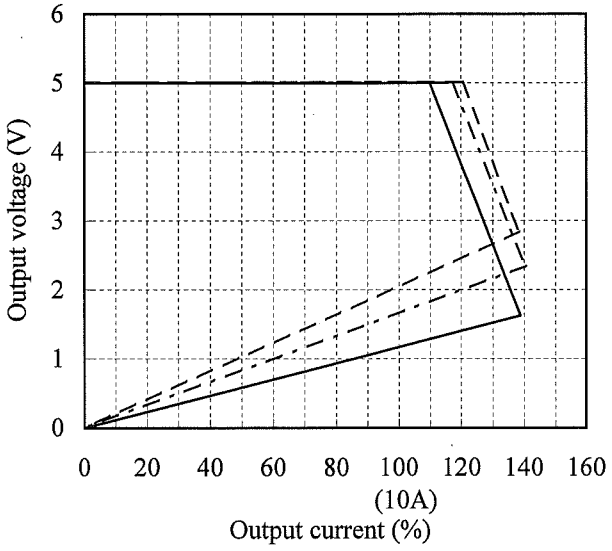
Conditions Vin : 60 VDC ----
: 110 VDC -·-·-·
: 160 VDC ——
Ta : 25 ℃

温度依存性
Temperature dependence

Conditions Vin : 110 VDC
Ta : -20 ℃ ----
: 25 ℃ -·-·-·
: 71 ℃ ——

5V





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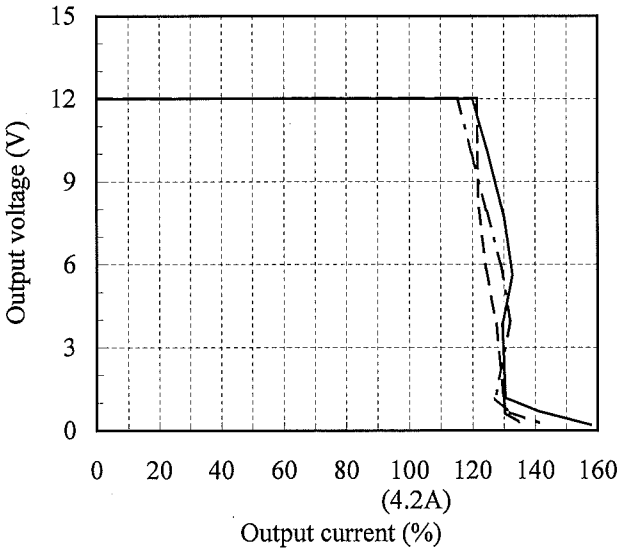
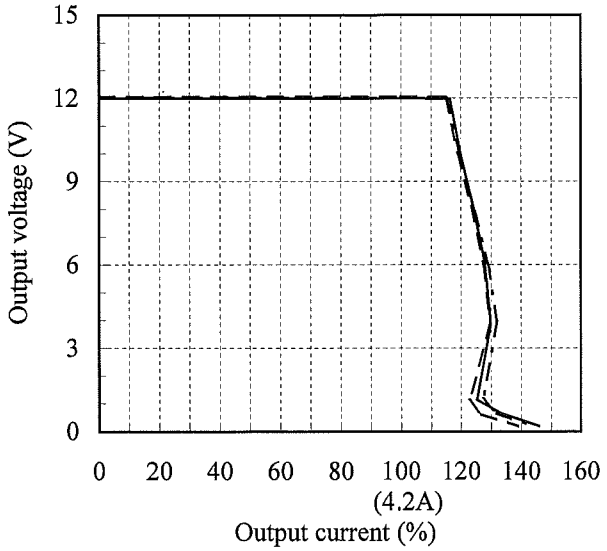




2.2 過電流保護特性
Over current protection (OCP) characteristics

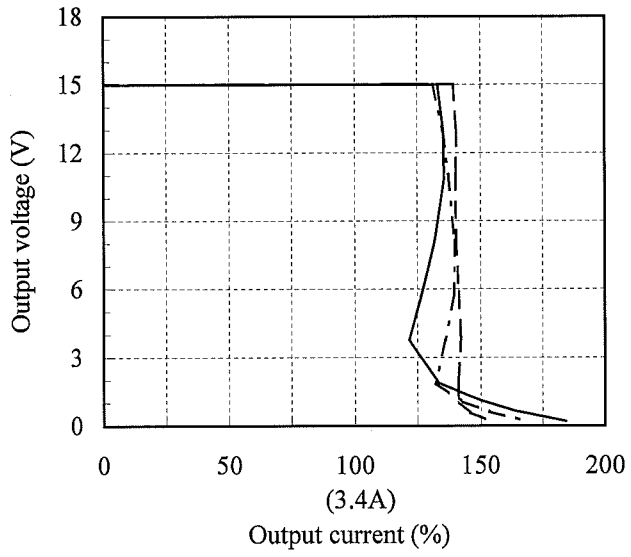
入力電圧依存性
Input voltage dependence

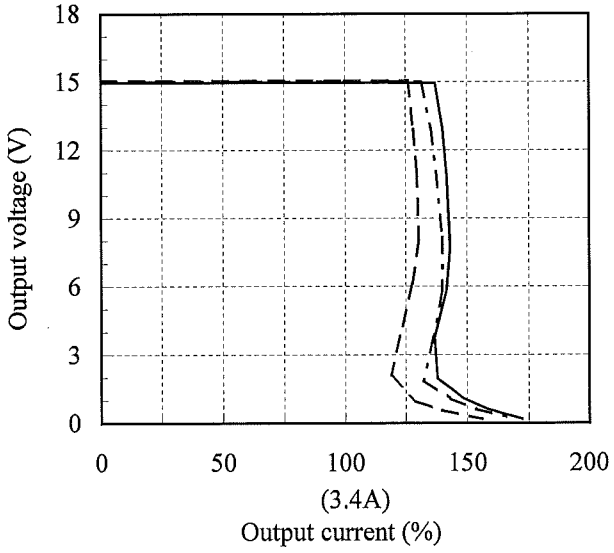
Conditions Vin : 60 VDC ----
: 110 VDC -·-·-
: 160 VDC ——
Ta : 25 ℃

温度依存性
Temperature dependence

Conditions Vin : 110 VDC
Ta : -20 ℃ ----
: 25 ℃ -·-·-
: 71 ℃ ——

15V





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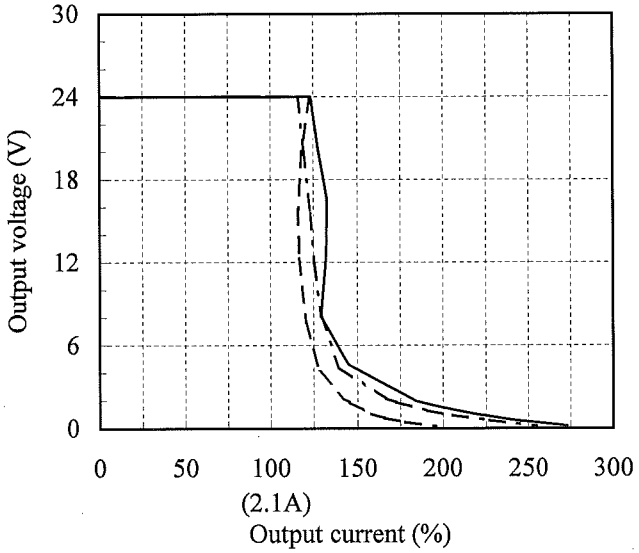
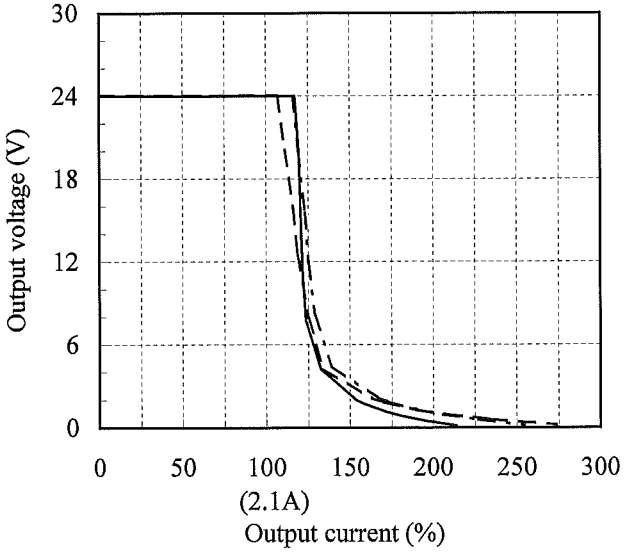


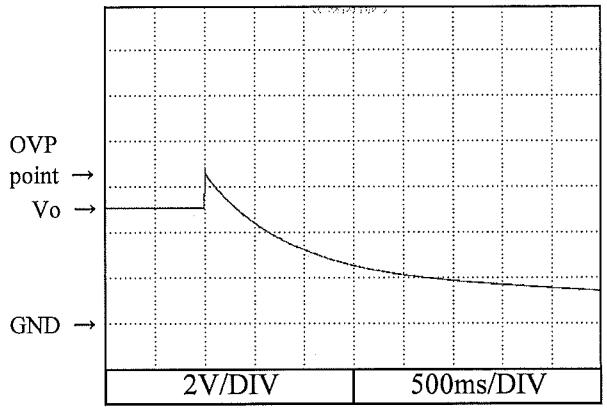


2.3 過電圧保護特性

Over voltage protection (OVP) characteristics

Conditions Vin : 110 VDC
Io : 0 %
Ta : 25 ℃

5V



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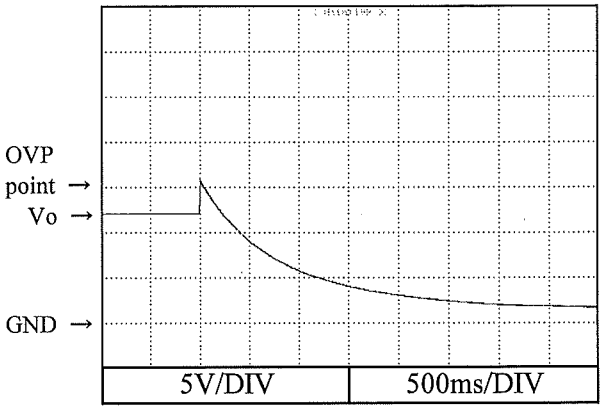
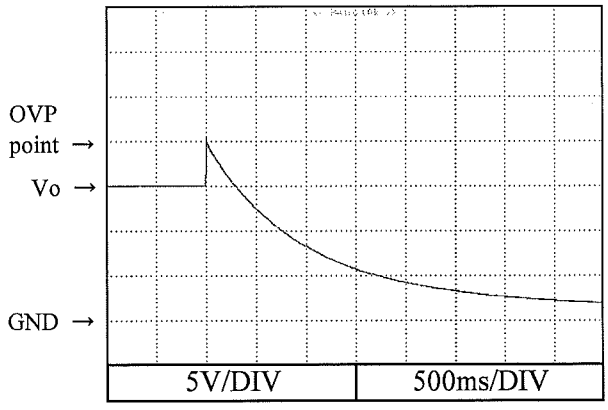
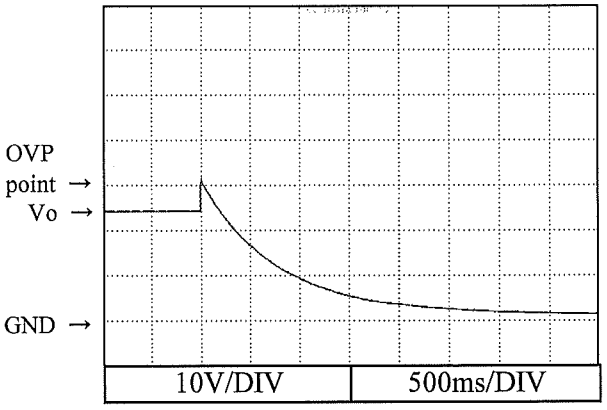


15V



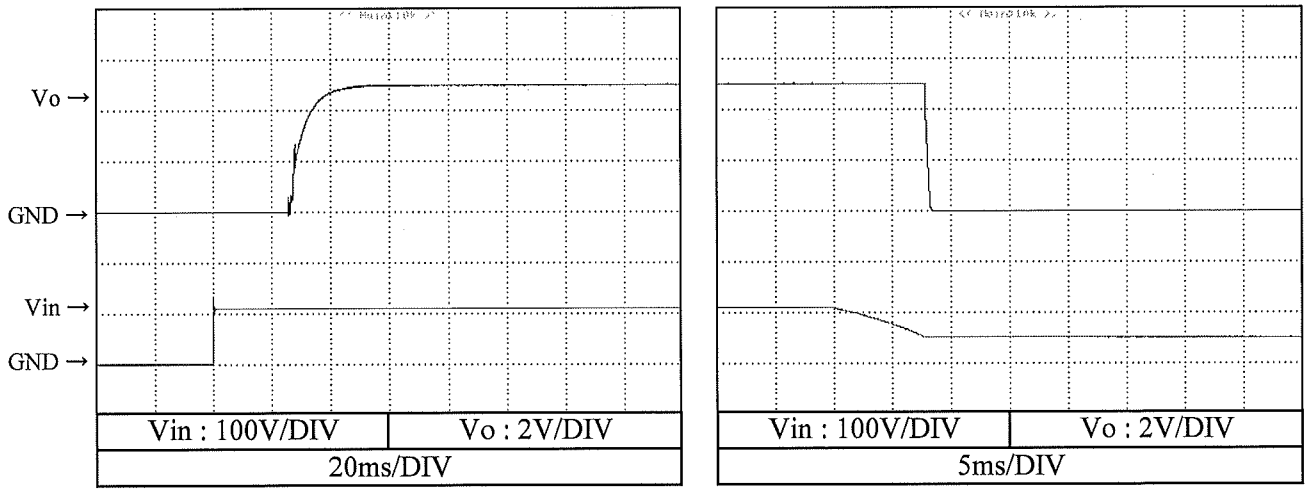
24V



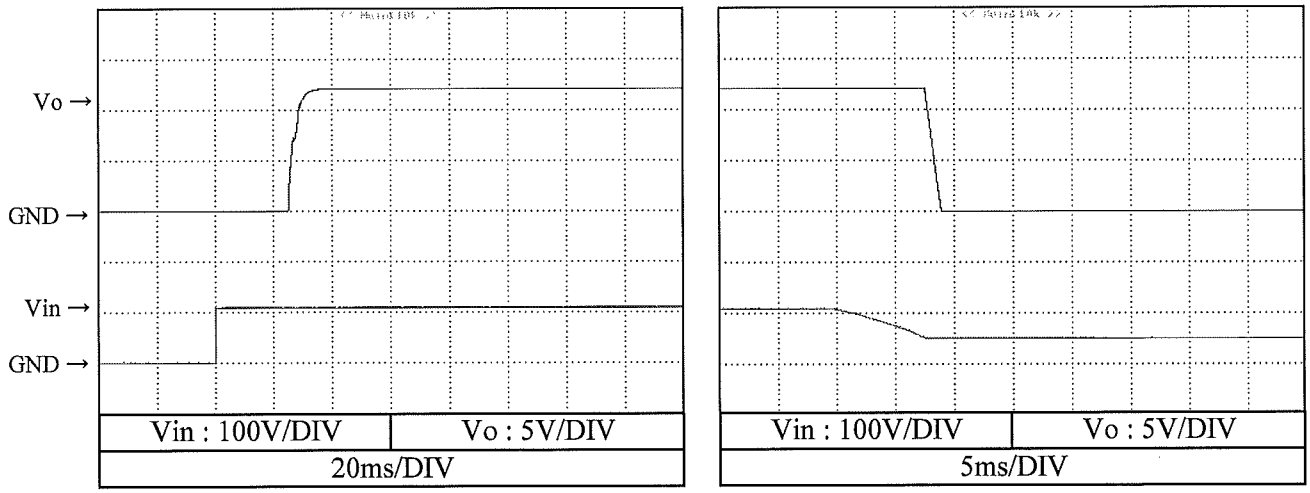
2.4 出力立ち上がり、立ち下がり特性
Output rise and fall characteristics

Conditions Vin : 110 VDC
Io : 100 %
Ta : 25℃

5V



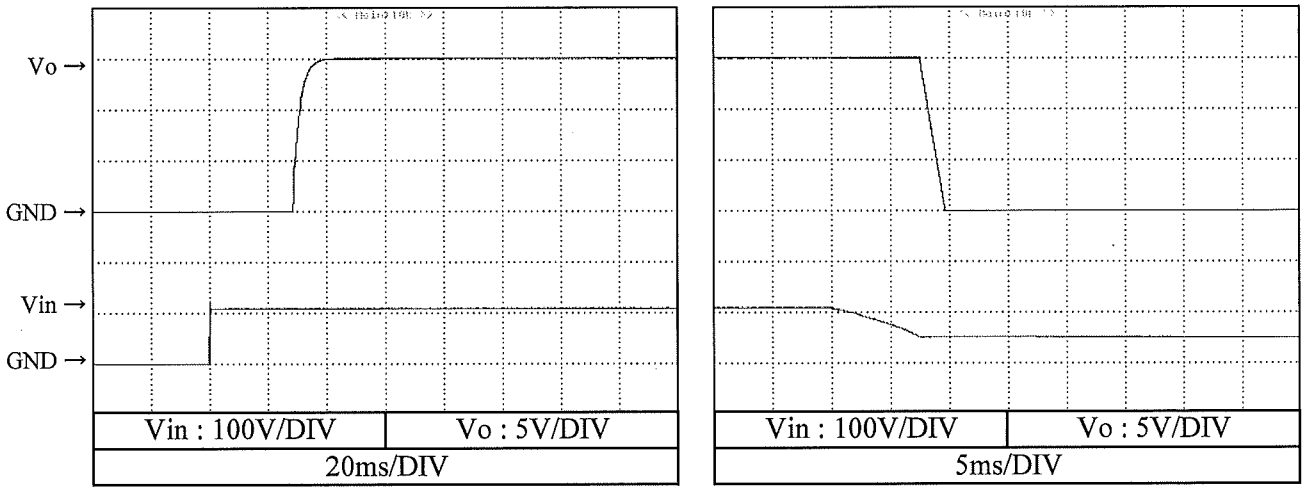
12V



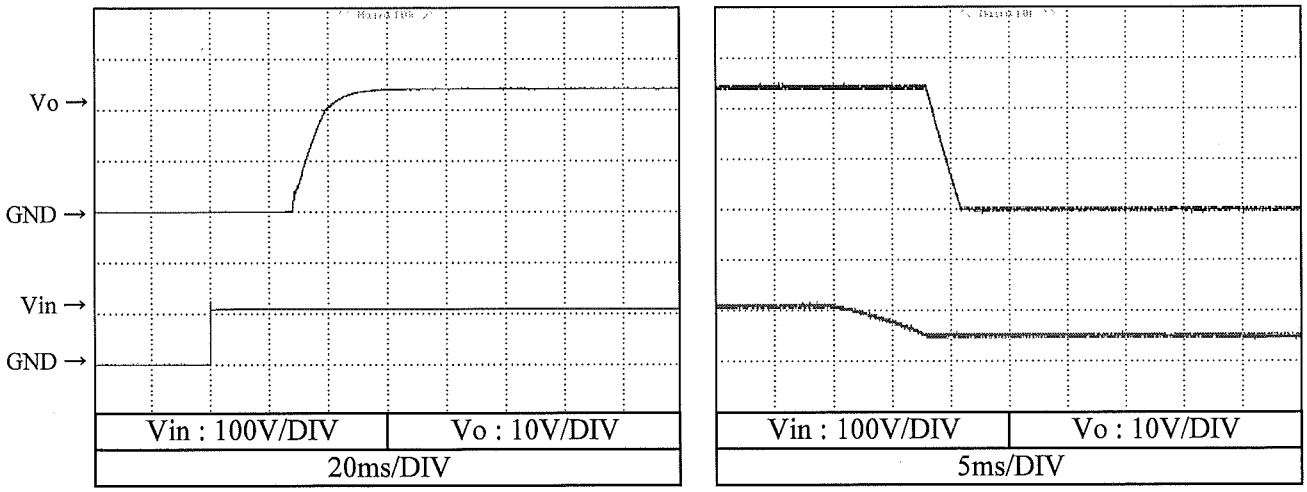
2.4 出力立ち上がり、立ち下がり特性
Output rise and fall characteristics

Conditions Vin : 110 VDC
Io : 100 %
Ta : 25℃

15V



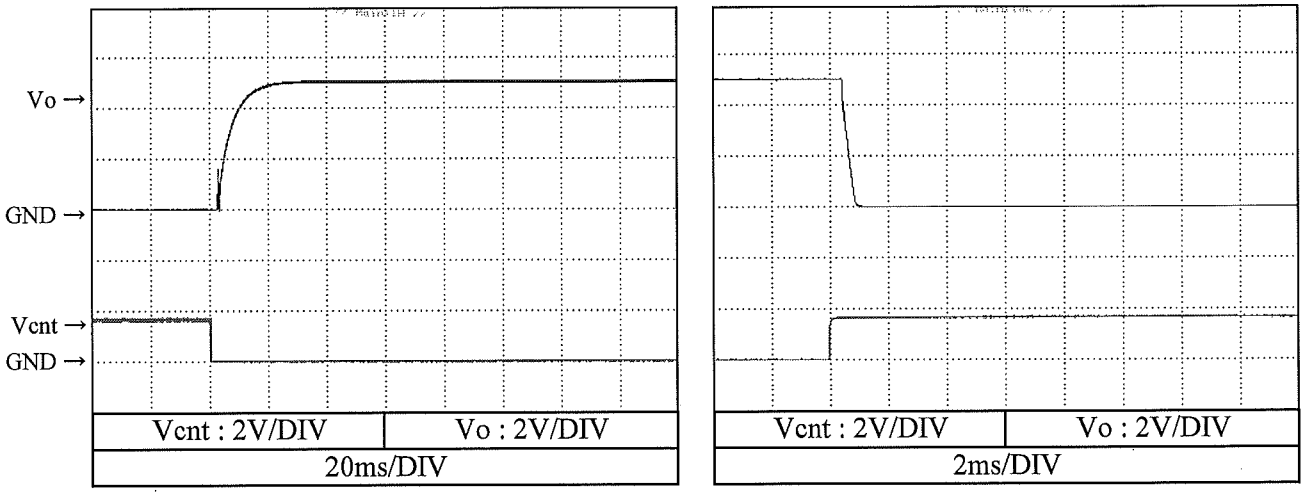
24V



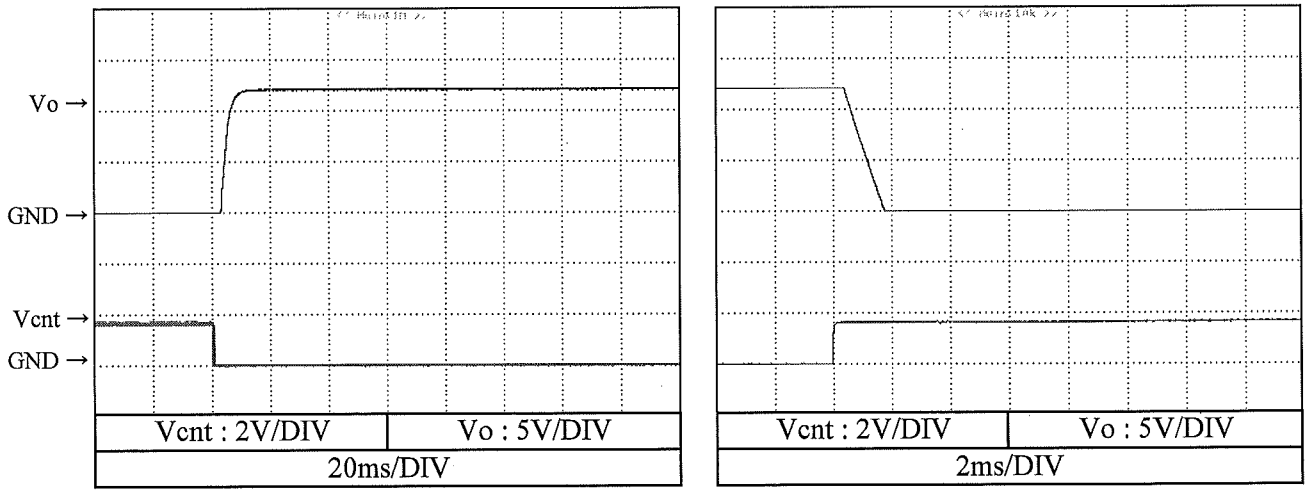
2.5 出力立ち上がり、立ち下がり特性 （ON/OFFコントロール時）
Output rise and fall characteristics with ON/OFF CONTROL

Conditions
Vin : 110 VDC
Io : 100 %
Ta : 25℃

5V



12V

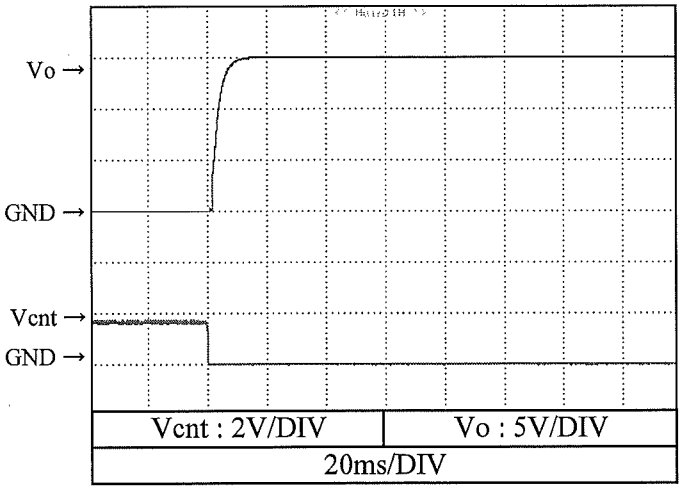


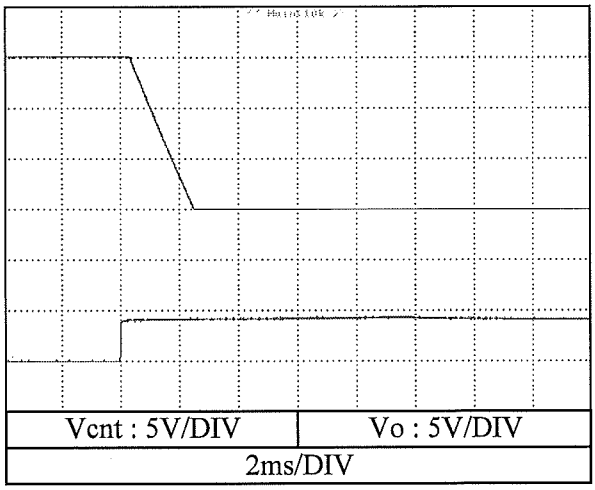
2.5 出力立ち上がり、立ち下がり特性 (ON/OFFコントロール時)

Output rise and fall characteristics with ON/OFF CONTROL

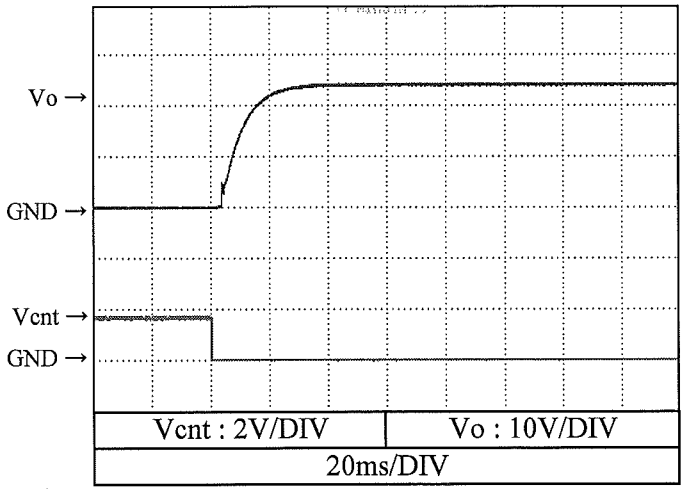
Conditions Vin : 110 VDC
Io : 100 %
Ta : 25℃

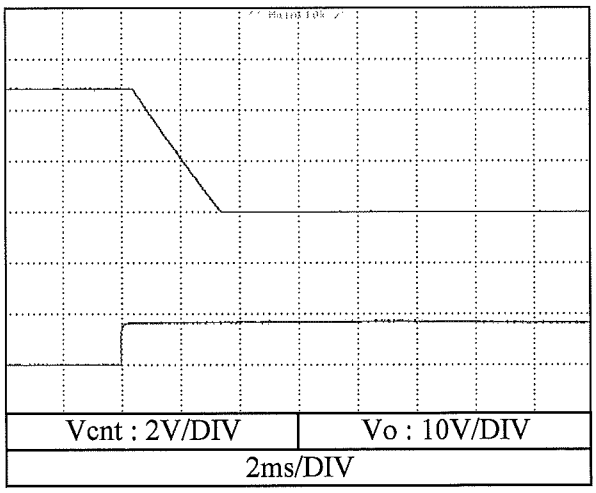
15V





24V

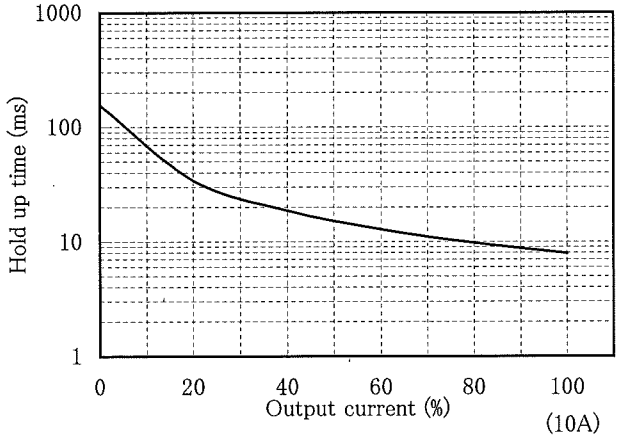




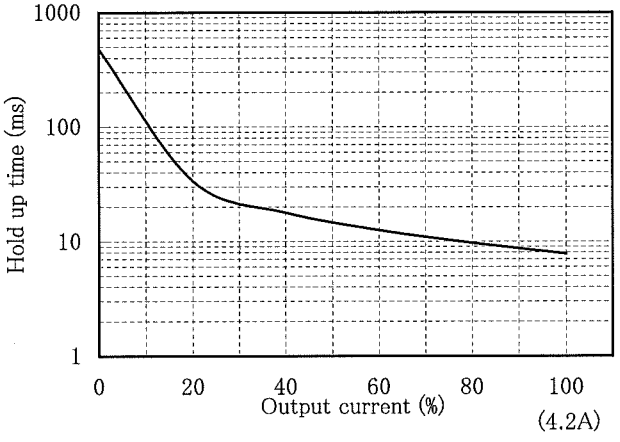
2.6 出力保持時間特性
Hold up time Characteristics

Conditions Vin : 110 VDC
Ta : 25 ℃

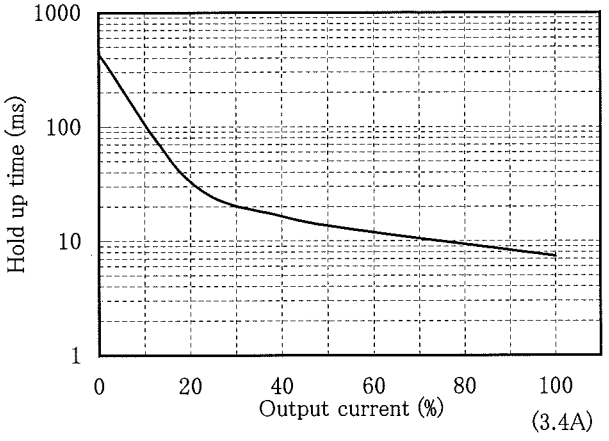
5V



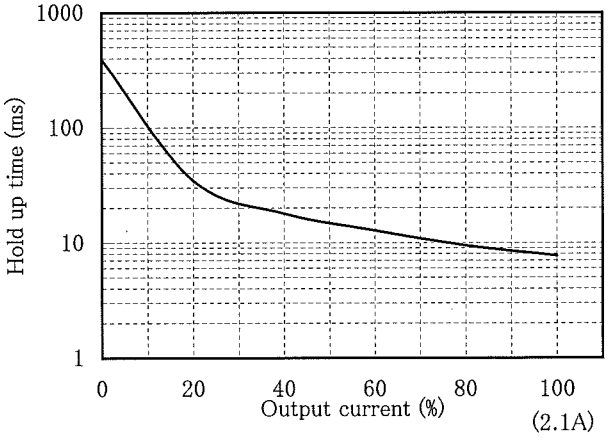
12V



15V



24V

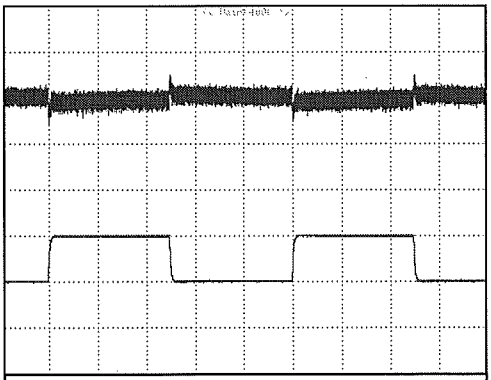


2.7 過渡応答（負荷急変）特性
Dynamic load response characteristics

Conditions Vin : 110 VDC
Io : 50% ⟷ 100 %
(tr = tf = 100us)
Ta : 25 ℃

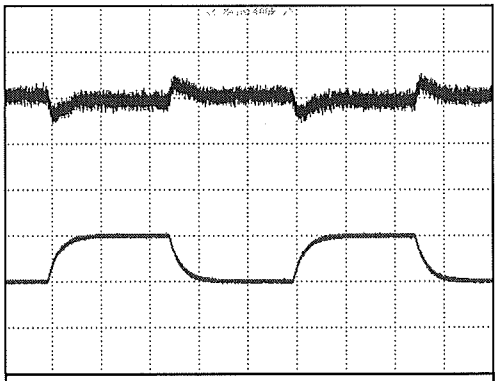
5V

f = 100Hz



Vo : 200mV/div, Io : 5A/div, Time : 2ms/div	
+101mV (+2.0%)	-114mV(-2.3%)

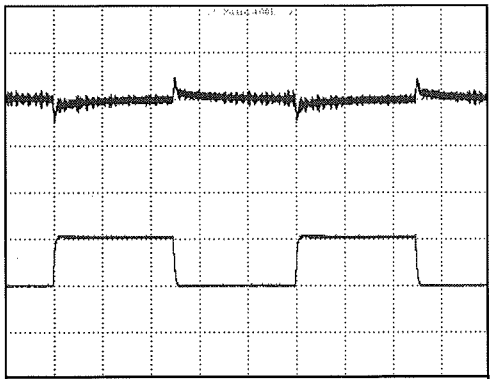
f = 1kHz



Vo : 200mV/div, Io : 5A/div, Time : 200us/div	
+104mV (+2.1%)	-108mV(-2.2%)

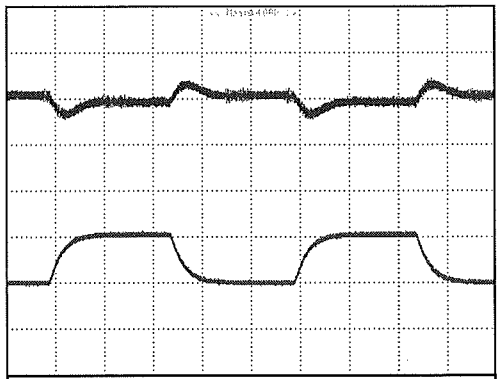
12V

f = 100Hz



Vo : 200mV/div, Io : 2A/div, Time : 2ms/div	
+92mV (+0.8%)	-97mV(-0.8%)

f = 1kHz



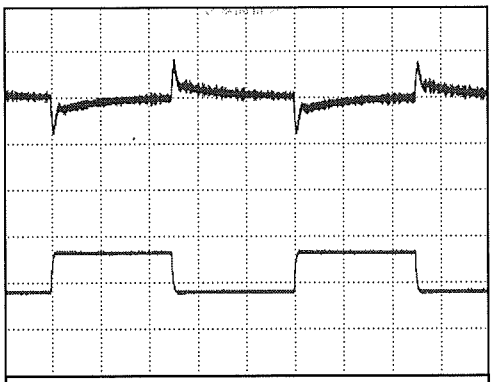
Vo : 200mV/div, Io : 2A/div, Time : 200us/div	
+88mV (+0.7%)	-88mV(-0.7%)

2.7 過渡応答（負荷急変）特性
Dynamic load response characteristics

Conditions Vin : 110 VDC
Io : 50% ⟷ 100 %
(tr = tf = 100us)
Ta : 25 ℃

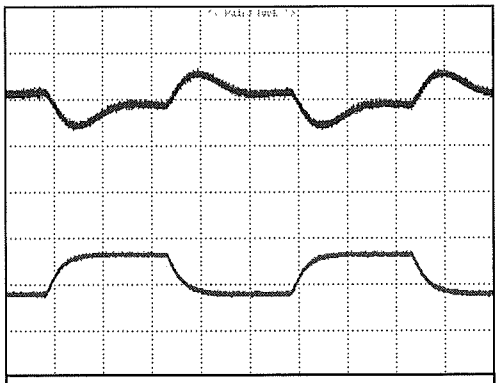
15V

f = 100Hz



Vo : 200mV/div, Io : 2A/div, Time : 2ms/div	
+164mV (+1.1%)	-156mV(-1.0%)

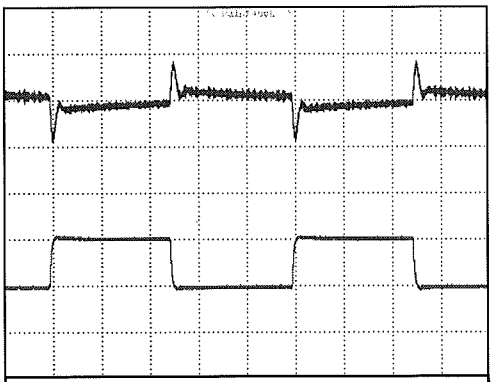
f = 1kHz



Vo : 200mV/div, Io : 2A/div, Time : 200us/div	
+133mV (+0.9%)	-133mV(-0.9%)

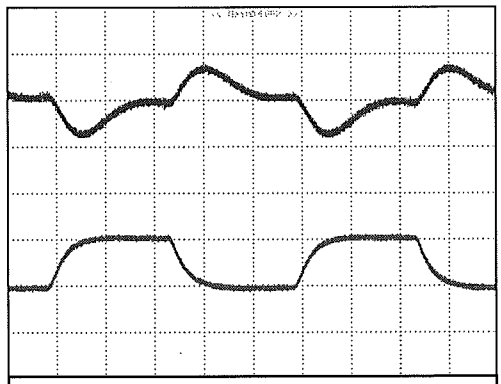
24V

f = 100Hz



Vo : 200mV/div, Io : 1A/div, Time : 2ms/div	
+167mV (+0.7%)	-176mV(-0.7%)

f = 1kHz

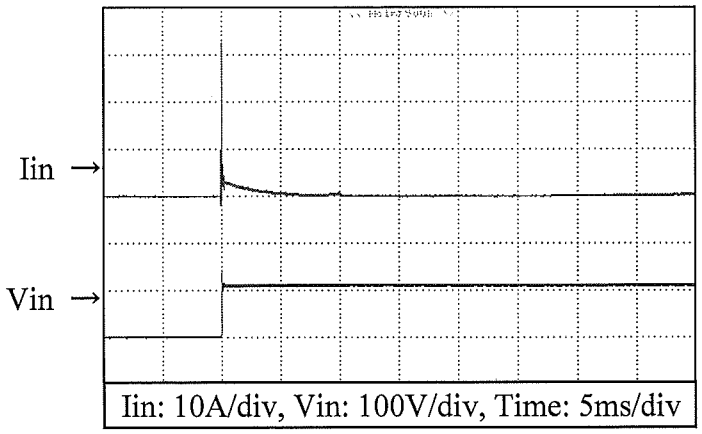


Vo : 200mV/div, Io : 1A/div, Time : 200us/div	
+154mV (+0.6%)	-158mV(-0.7%)

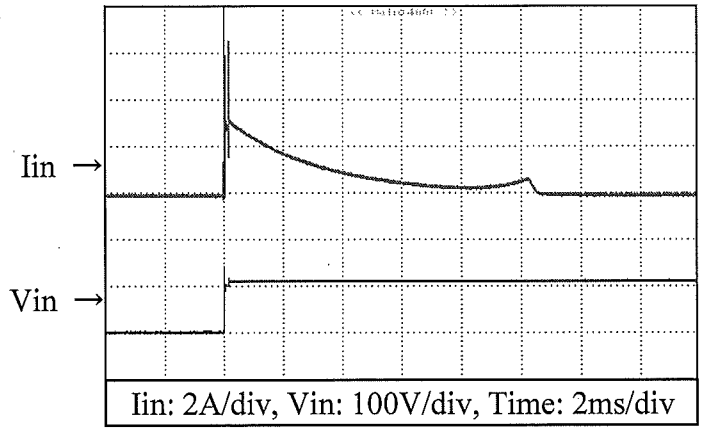
2.8 入力サージ電流（突入電流）特性
Inrush current characteristics

Conditions Vin : 110 VDC
Io : 100 %
Ta : 25 ℃

24V



拡 大
Zoom in

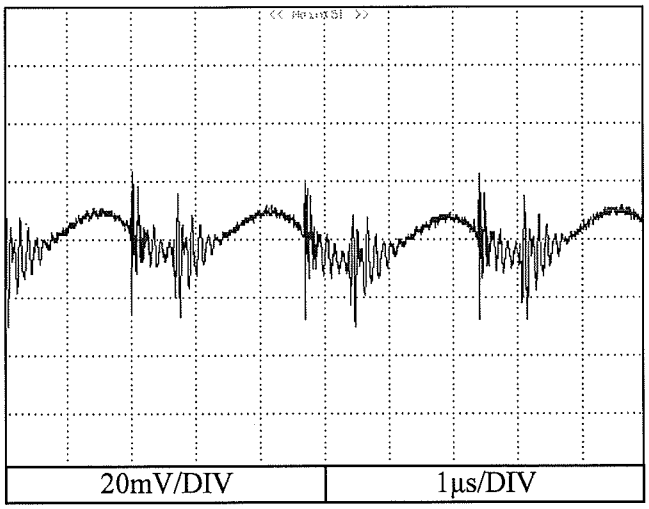


本特性は、いずれの出力電圧モデルにおいても同様となります。
This characteristics is same for each output model.

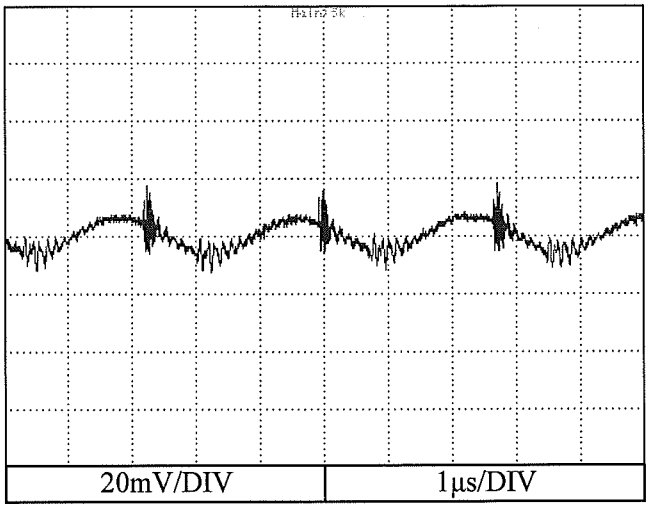
2.9 出力リップル、ノイズ波形
Output ripple and noise waveform

Conditions Vin : 110 VDC
Io : 100 %
Ta : 25 ℃

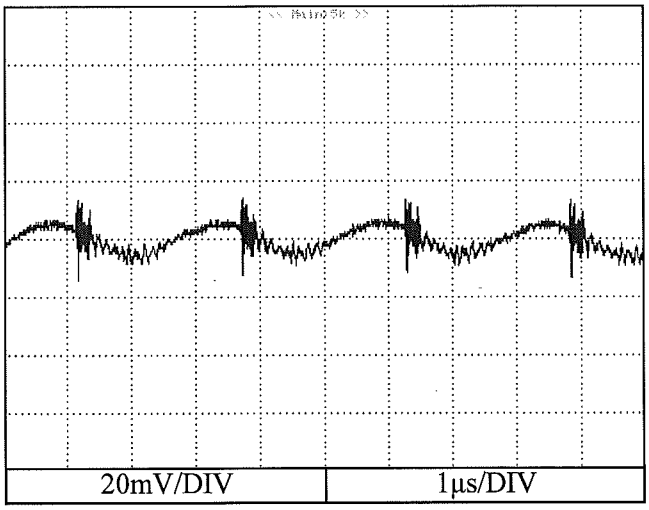
5V



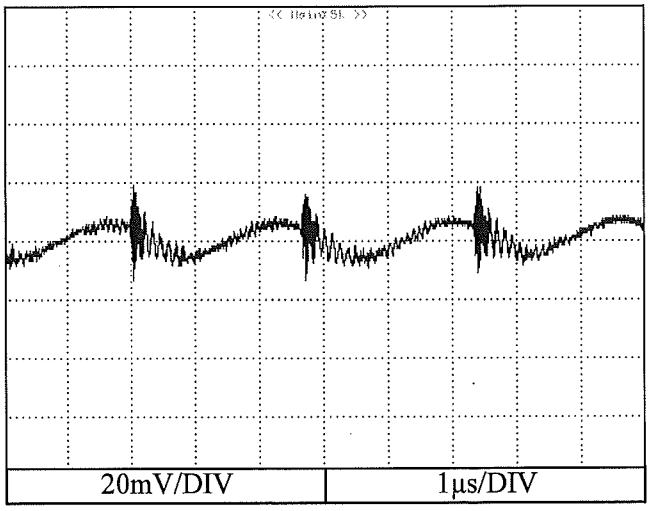
12V



15V



24V



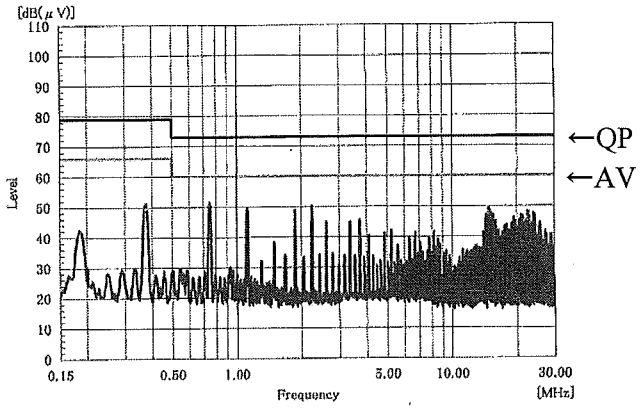
2.10 EMI特性
Electro-Magnetic Interference characteristics

雑音端子電圧
Conducted Emission

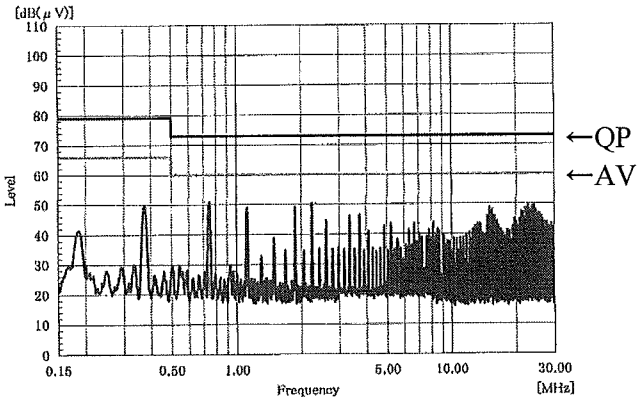
Conditions　Vin : 110 VDC
Io : 100 %

5V

-Vin

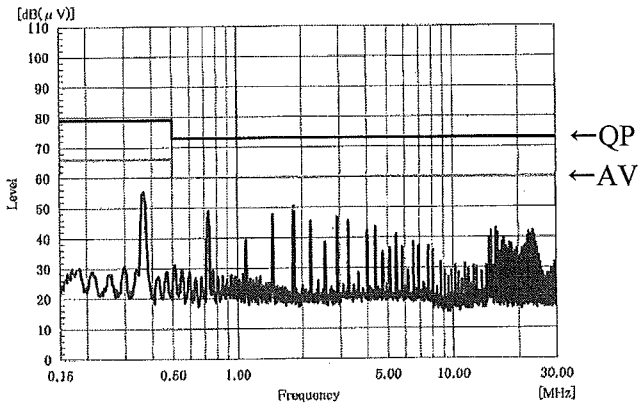


+Vin

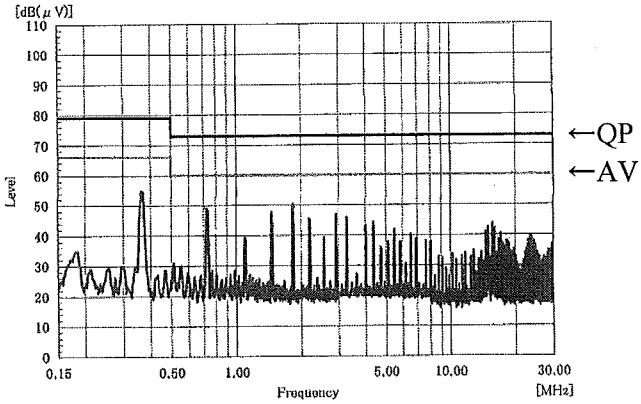


12V

-Vin



+Vin



EN55011-A,EN55022-Aの限界値はVCCI class Aの限界値と同じです。
Limit of EN55011-A,EN55022-A are same as its VCCI class A.

表示はピーク値です。
Indication is peak values.

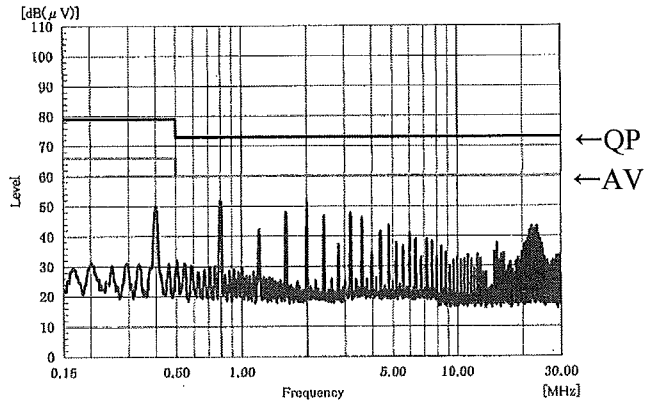
2.10 EMI特性
Electro-Magnetic Interference characteristics

雑音端子電圧
Conducted Emission

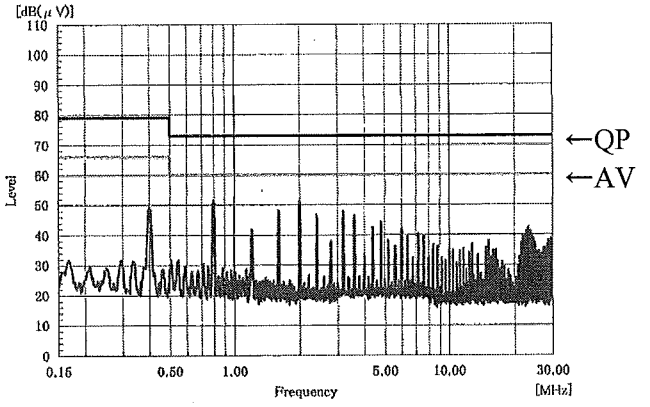
Conditions　Vin : 110 VDC
Io : 100 %

15V

-Vin

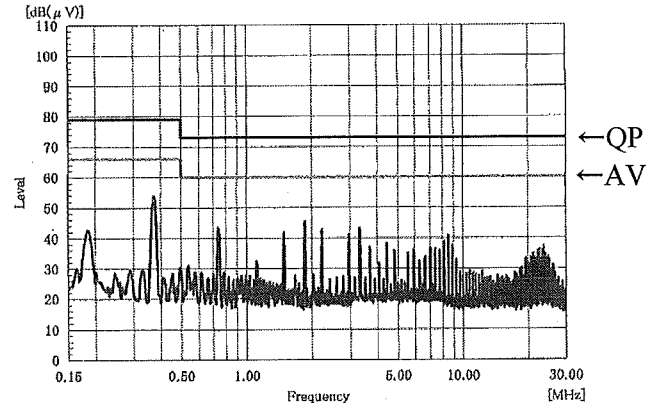


+Vin

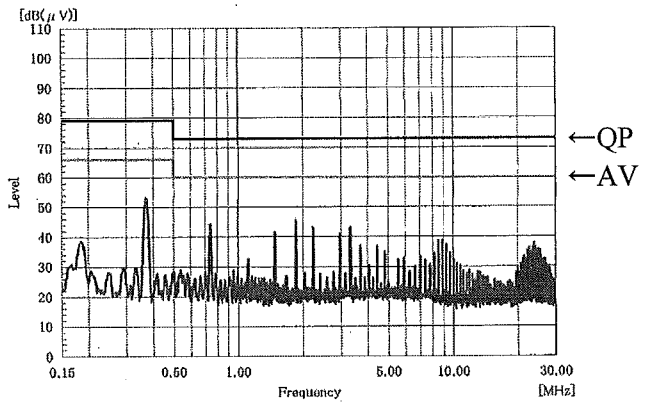


24V

-Vin



+Vin



EN55011-A,EN55022-Aの限界値はVCCI class Aの限界値と同じです。
Limit of EN55011-A,EN55022-A are same as its VCCI class A.

表示はピーク値です。
Indication is peak values.

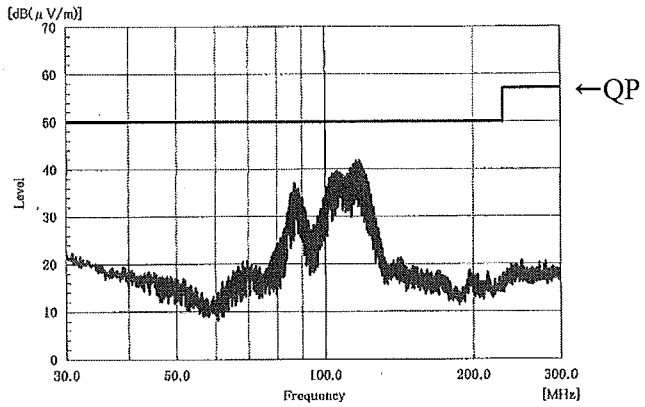
2.10 EMI特性
Electro-Magnetic Interference characteristics

雑音電界強度
Radiated Emission

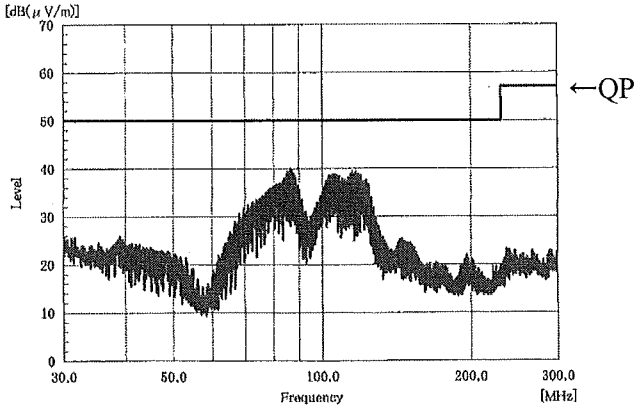
Conditions Vin : 110 VDC
Io : 100 %

5V

HORIZONTAL

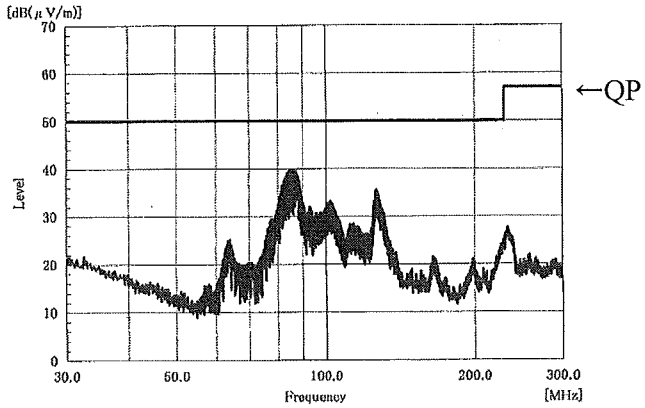


VERTICAL

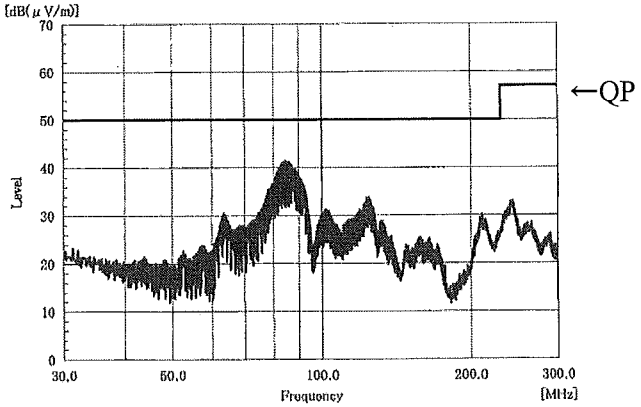


12V

HORIZONTAL



VERTICAL



EN55011-A,EN55022-Aの限界値はVCCI class Aの限界値と同じです。
Limit of EN55011-A,EN55022-A are same as its VCCI class A.

表示はピーク値です。
Indication is peak values.

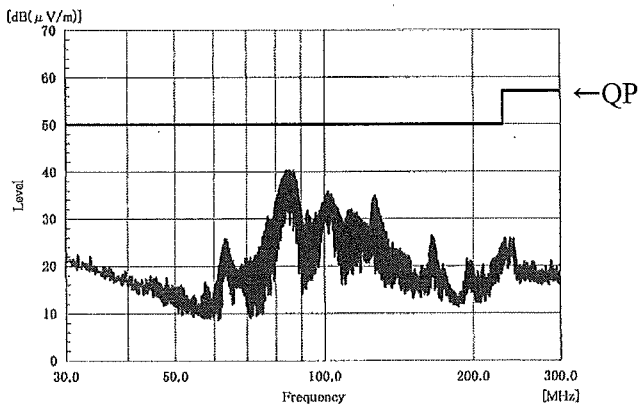
2.10 EMI特性
Electro-Magnetic Interference characteristics

雑音電界強度
Radiated Emission

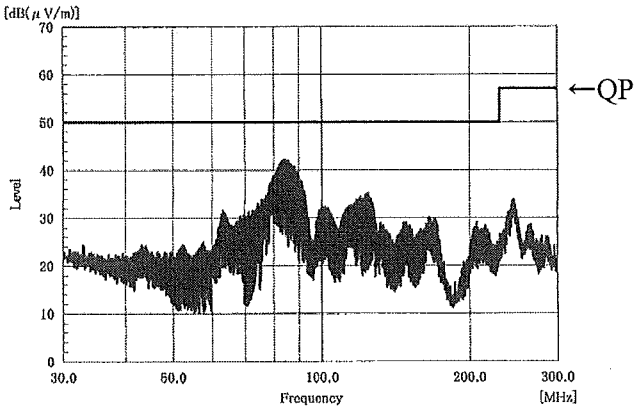
Conditions Vin : 110 VDC
Io : 100 %

15V

HORIZONTAL

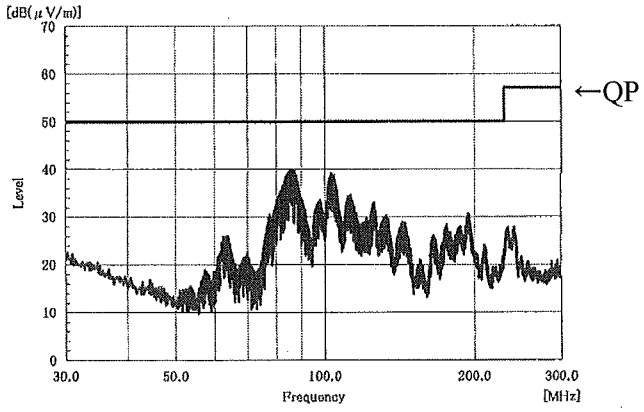


VERTICAL

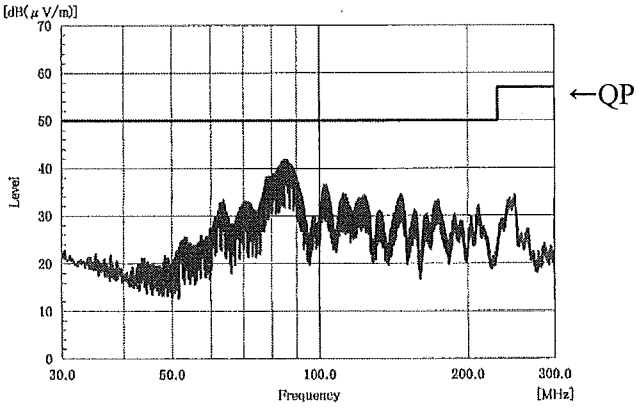


24V

HORIZONTAL



VERTICAL



EN55011-A,EN55022-Aの限界値はVCCI class Aの限界値と同じです。
Limit of EN55011-A,EN55022-A are same as its VCCI class A.

表示はピーク値です。
Indication is peak values.