

# RDS60-48

## EVALUATION DATA

### 型式データ

DWG No. B028-53-01/48		
APPD	CHK	DWG
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11. Nov. '11	10. Nov. '11	9. Nov. '11

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## 略称記号説明

## Abbreviation Symbol Description

V <sub>in</sub>	.....	入力電圧	Input voltage
V <sub>out</sub>	.....	出力電圧	Output voltage
I <sub>in</sub>	.....	入力電流	Input current
I <sub>out</sub>	.....	出力電流	Output current
T <sub>a</sub>	.....	周囲温度	Ambient temperature
f	.....	周波数	Frequency
CNT (RC)	.....	ON/OFF制御	ON/OFF control
EMI	.....	電磁妨害(干渉)	Electro-Magnetic Interference

1. 測定方法 Evaluation Method

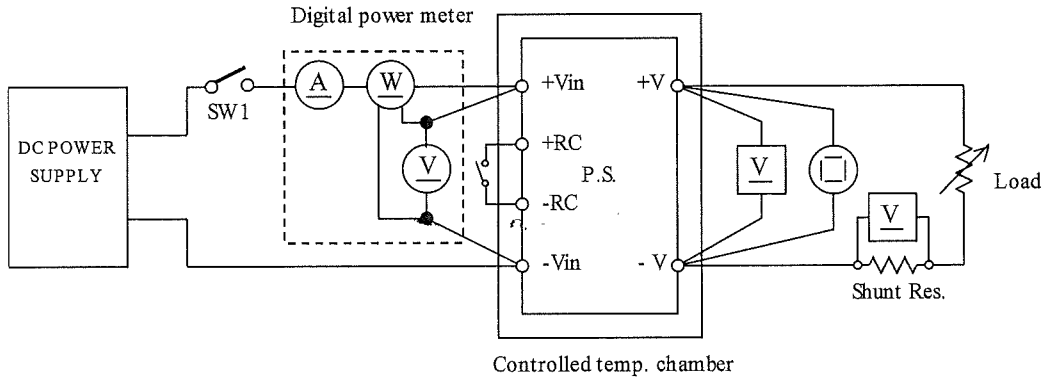
1.1 測定回路 Measurement Circuit

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 Characteristics
- Over Current Protection (OCP) Characteristics
- Over Voltage Protection (OVP) Characteristics
- Output Rise / Fall Characteristics
- Hold up Time Characteristics

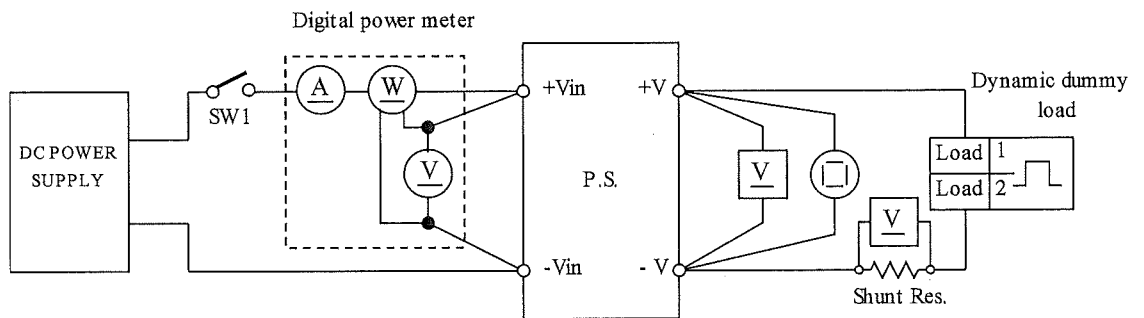


測定回路 2

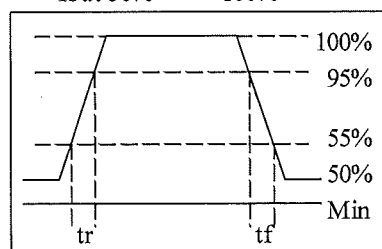
- ・ 過渡応答 (負荷急変) 特性

Measurement Circuit 2

- Dynamic Load Response Characteristics



Output current waveform  
Iout 50%  $\longleftrightarrow$  100%

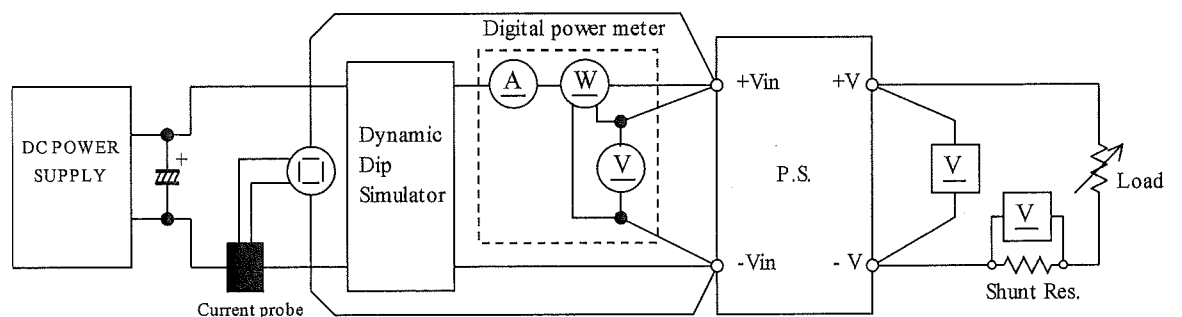


測定回路 3

- ・ 入力サージ電流 (突入電流) 特性

Measurement Circuit 3

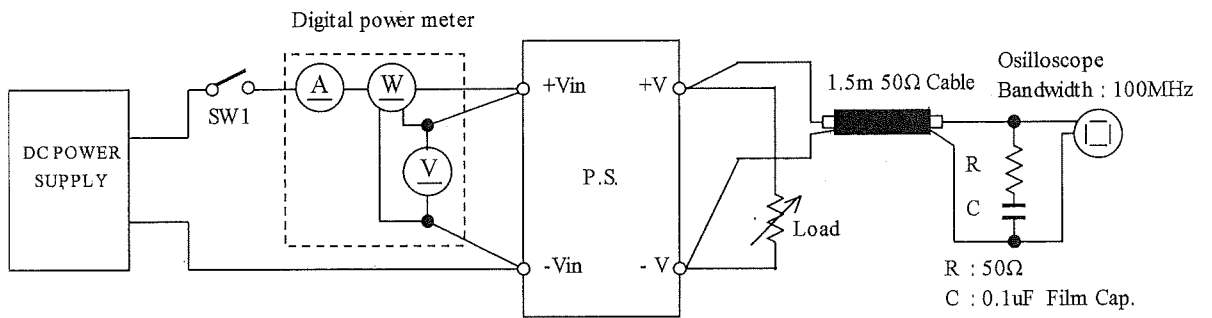
- Inrush Current Characteristics



測定回路 4.

Measurement Circuit 4

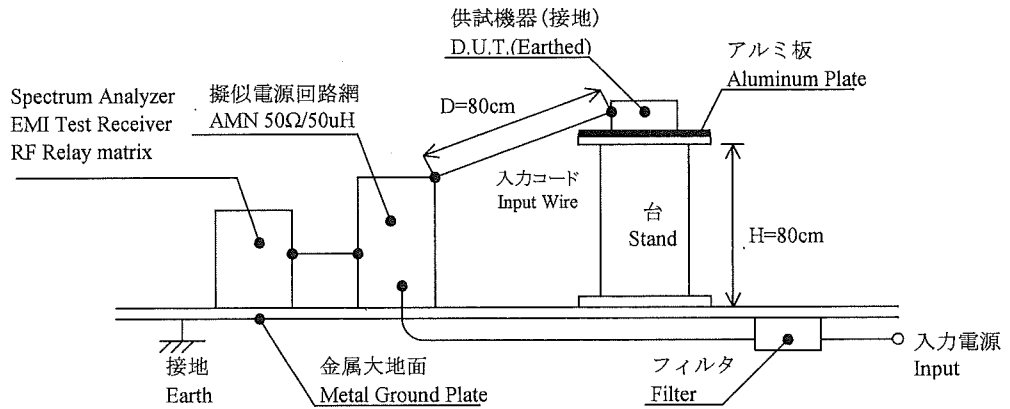
- 出力リップル、ノイズ特性  
ノーマルモード (JEITA Standard RC-9131A)      Output Ripple and Noise Waveform  
Normal Mode (JEITA Standard RC-9131A)



測定構成図

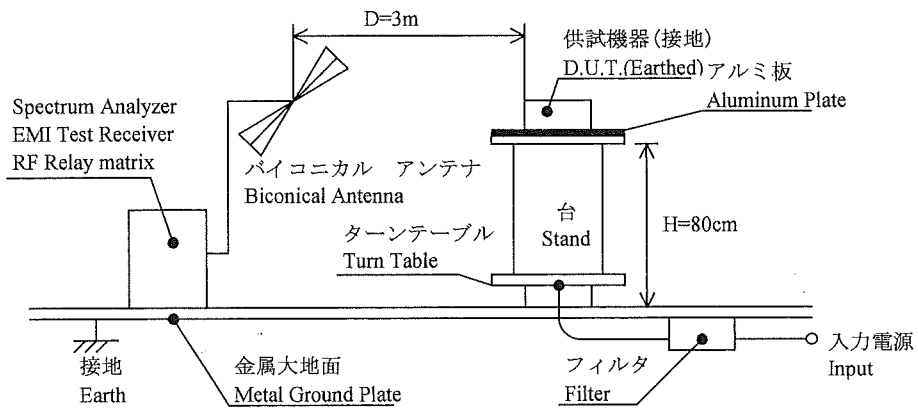
Measurement System

- EMI 特性  
雑音端子電圧 (帰還ノイズ)      EMI Characteristics  
Conducted Emission Noise



雑音電界強度 (輻射ノイズ)

Radiated Emission Noise



## 1.2 測定機器リスト Measurement Equipment List

	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	701930
5	ELECTRIC LOAD	TAKASAGO	FK-400L
6	CVCF (AC/DC POWER SUPPLY)	TAKASAGO	AA2000XG
7	DYNAMIC DIP SIMULATOR	TAKAMIZAWA	PSA-210
8	CONTROLLED TEMP. CHAMBER	ESPEC	SU-641
9	HYBLID RECORDER	YOKOGAWA ELECTRIC	DR230
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 Characteristics

## (1) 入力・負荷・温度変動／出力起動・低下電圧

Line and Load Regulation, Temperature Drift, Start up and Drop out Input Voltage

5V

## 1. Line and Load Regulation Condition Ta : 25 °C

Iout \ Vin	36VDC	48VDC	63VDC	Line Regulation	
0%	5.053V	5.050V	5.049V	4mV	0.080%
50%	5.020V	5.018V	5.017V	3mV	0.060%
100%	4.987V	4.984V	4.985V	3mV	0.060%
Load	66mV	66mV	64mV		
Regulation	1.320%	1.320%	1.280%		

2. Temperature Drift Conditions Vin : 48 VDC  
Iout : 100 %

Ta	-20°C	+25°C	+50°C	Temperature Stability	
Vout	5.006V	4.984V	4.975V	31mV	0.620%

3. Start up and Drop out Input Voltage Conditions Ta : 25 °C  
Iout : 100 %

Start up voltage (Vin)	31.5VDC
Drop out voltage (Vin)	31.3VDC

12V

## 1. Line and Load Regulation Condition Ta : 25 °C

Iout \ Vin	36VDC	48VDC	63VDC	Line Regulation	
0%	12.042V	12.023V	12.022V	20mV	0.167%
50%	12.027V	12.017V	12.012V	15mV	0.125%
100%	12.012V	12.000V	11.995V	17mV	0.142%
Load	30mV	23mV	27mV		
Regulation	0.250%	0.192%	0.225%		

24V

## 1. Line and Load Regulation Condition Ta : 25 °C

Iout \ Vin	36VDC	48VDC	63VDC	Line Regulation	
0%	23.995V	23.957V	23.951V	44mV	0.183%
50%	23.989V	23.974V	23.957V	32mV	0.133%
100%	23.979V	23.962V	23.945V	34mV	0.142%
Load	16mV	17mV	12mV		
Regulation	0.067%	0.071%	0.050%		

2. Temperature Drift Conditions Vin : 48 VDC  
Iout : 100 %

Ta	-20°C	+25°C	+50°C	Temperature Stability	
Vout	24.095V	23.962V	23.905V	190mV	0.792%

3. Start up and Drop out Input Voltage Conditions Ta : 25 °C  
Iout : 100 %

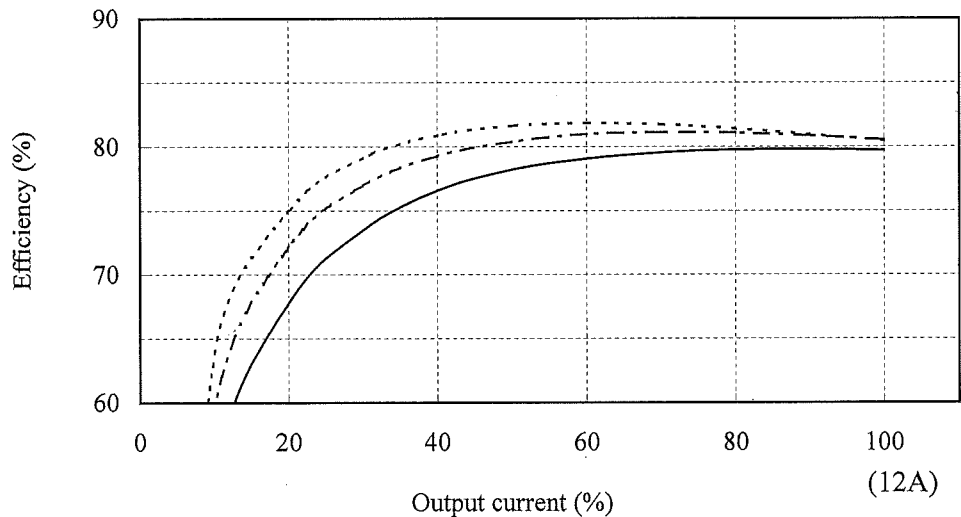
Start up voltage (Vin)	31.0VDC
Drop out voltage (Vin)	28.2VDC

(2) 出力電流 対 効率

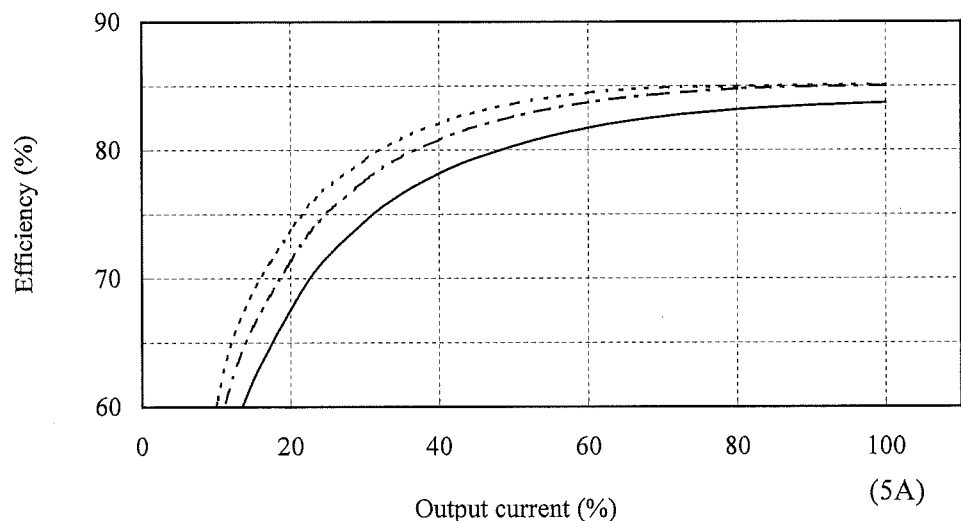
Efficiency vs. Output Current

Conditions Vin : 36 VDC -----  
 48 VDC - - - - -  
 63 VDC ————  
 Ta : 25 °C

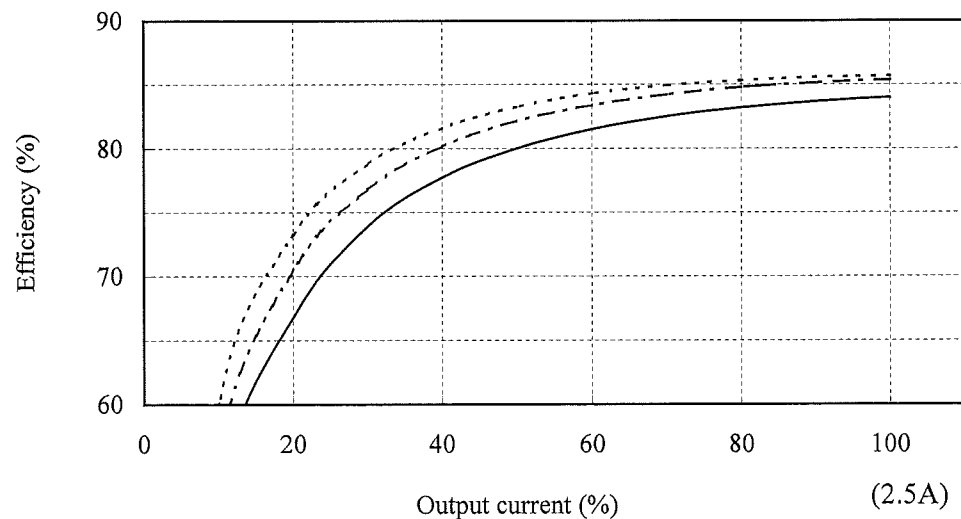
5V



12V



24V

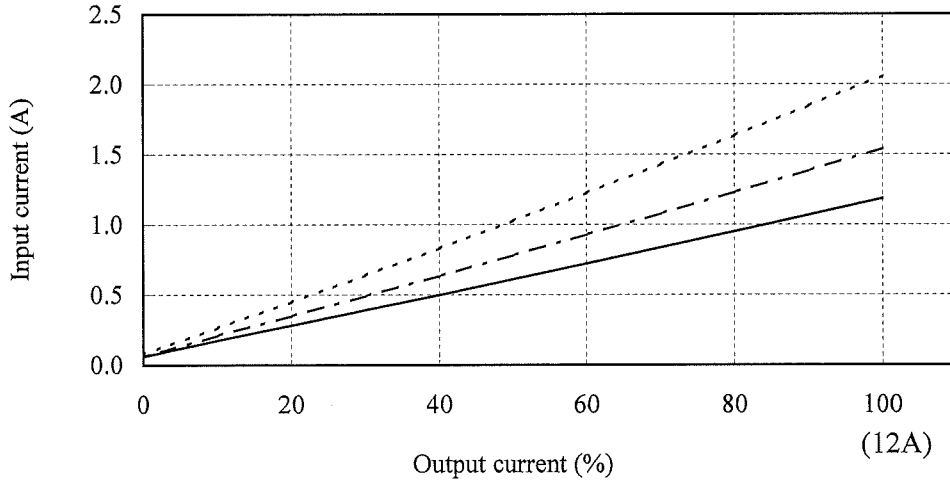


(3) 出力電流 対 入力電流

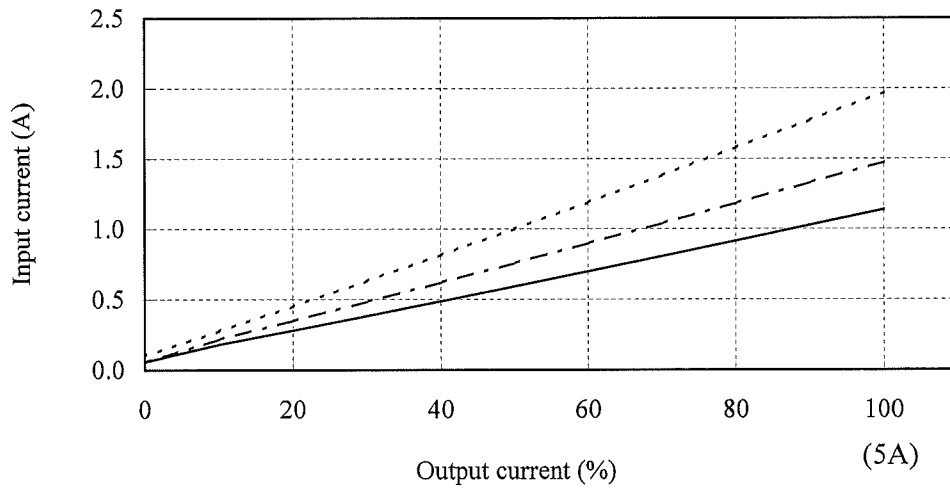
Input Current vs. Output Current

Conditions Vin : 36 VDC -----  
 48 VDC - - - - -  
 63 VDC ————  
 Ta : 25 °C

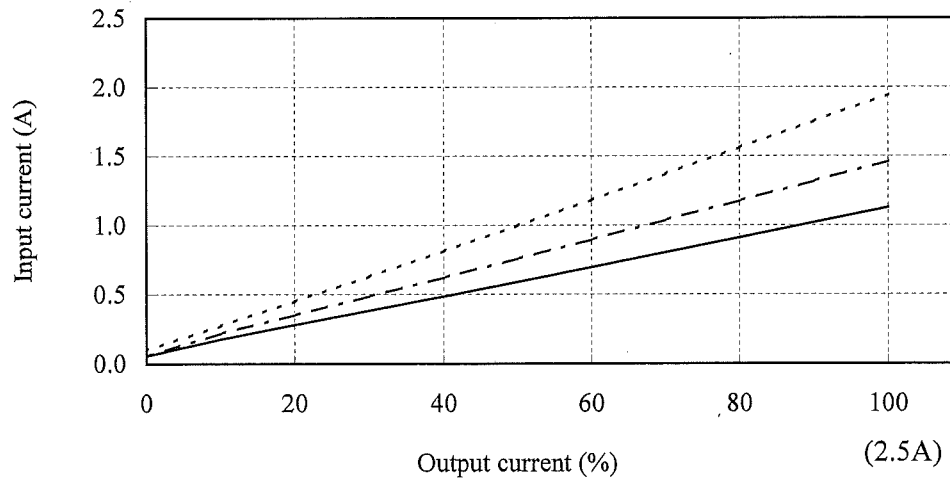
5V



12V



24V





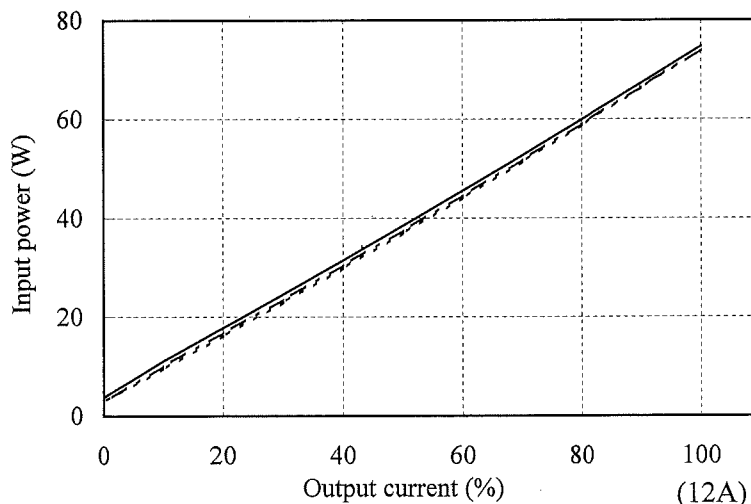
(4) 出力電流 対 入力電力  
Input Power vs. Output Current

Conditions Vin : 36 VDC -----  
48 VDC -.-.-.  
63 VDC ———  
Ta : 25 °C

5V

Condition Iout : 0%	
Vin	Input power
36VDC	2.9W
48VDC	2.8W
63VDC	3.8W

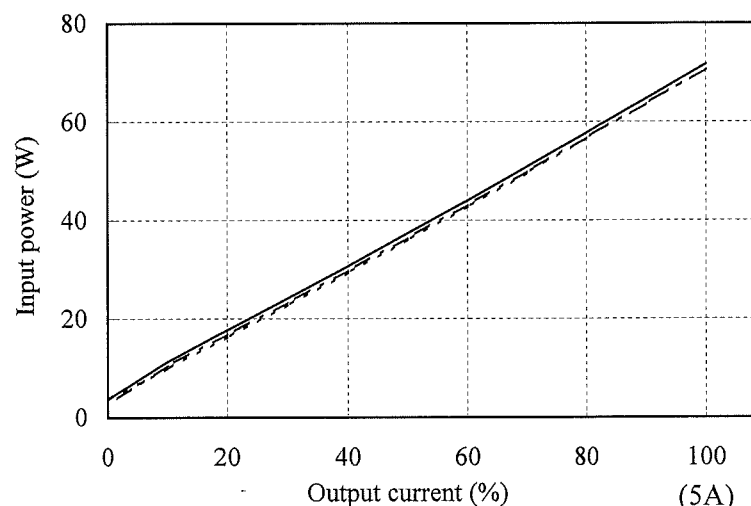
Condition CNT (RC) : OFF	
Vin	Input power
36VDC	0.23W
48VDC	0.43W
63VDC	0.82W



12V

Condition Iout : 0%	
Vin	Input power
36VDC	3.7W
48VDC	2.7W
63VDC	3.8W

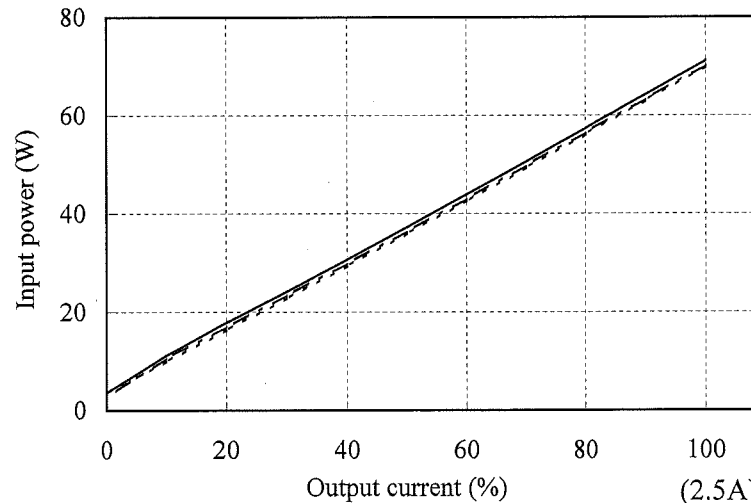
Condition CNT (RC) : OFF	
Vin	Input power
36VDC	0.23W
48VDC	0.43W
63VDC	0.82W



24V

Condition Iout : 0%	
Vin	Input power
36VDC	3.6W
48VDC	2.7W
63VDC	3.7W

Condition CNT (RC) : OFF	
Vin	Input power
36VDC	0.23W
48VDC	0.43W
63VDC	0.82W

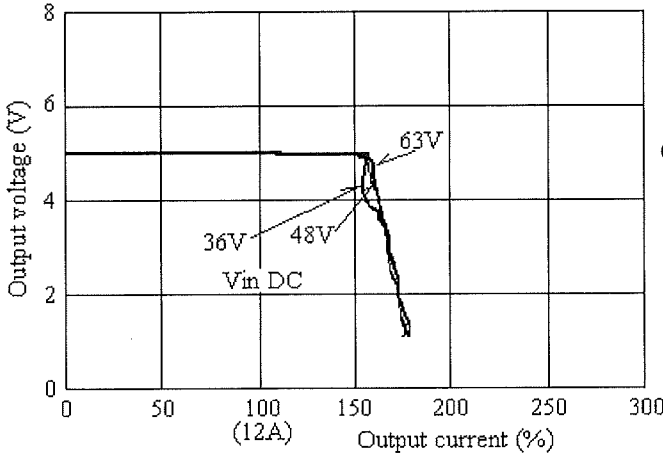


2.2 過電流保護特性

Over Current Protection (OCP) Characteristics

Conditions Vin : 36,48,63VDC  
Ta : 25 °C

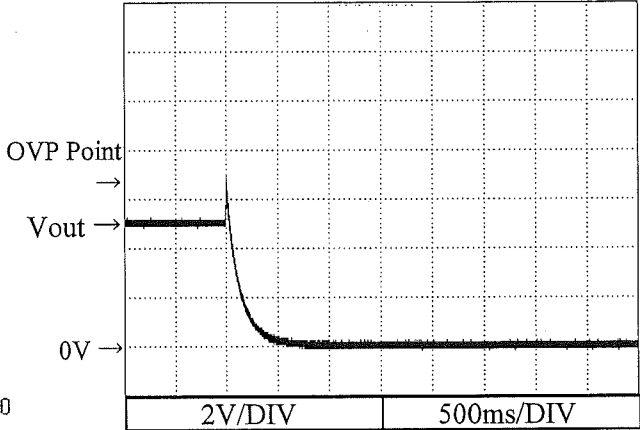
5V



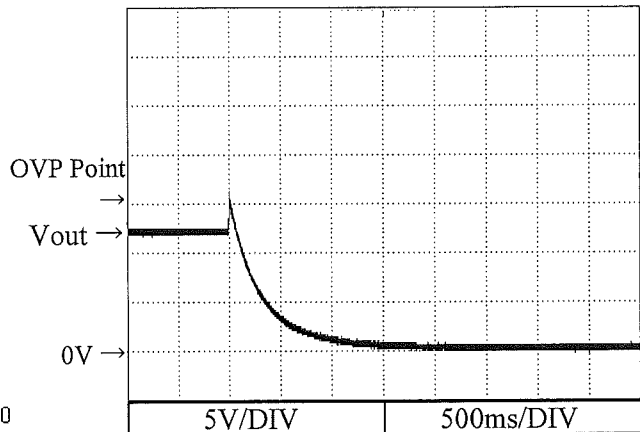
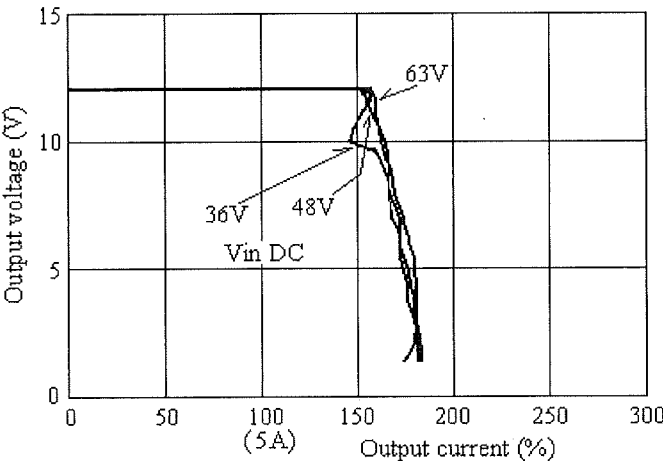
2.3 過電圧保護特性

Over Voltage Protection (OVP) Characteristics

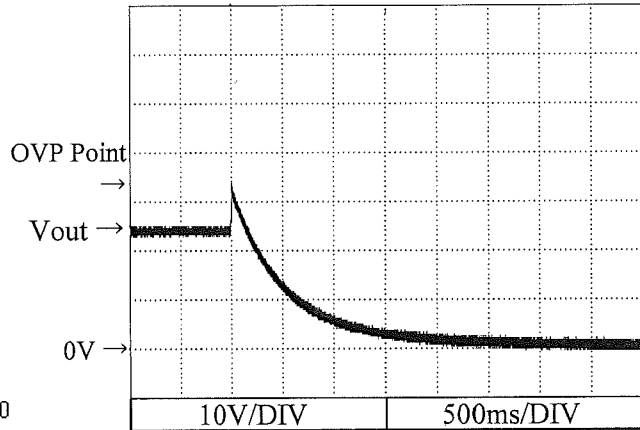
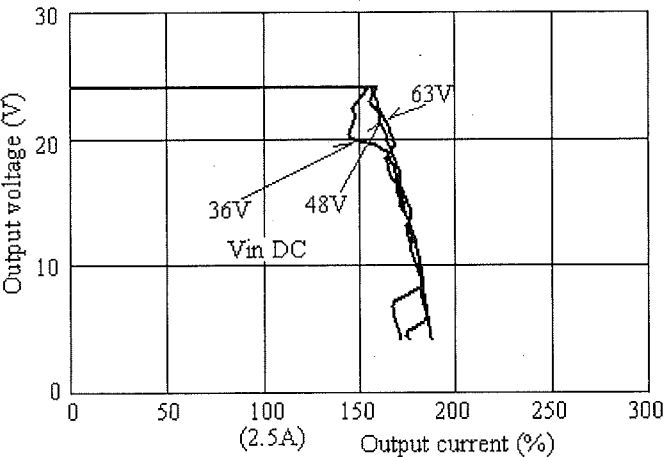
Conditions Vin : 48 VDC  
Iout : 0 %  
Ta : 25 °C



12V



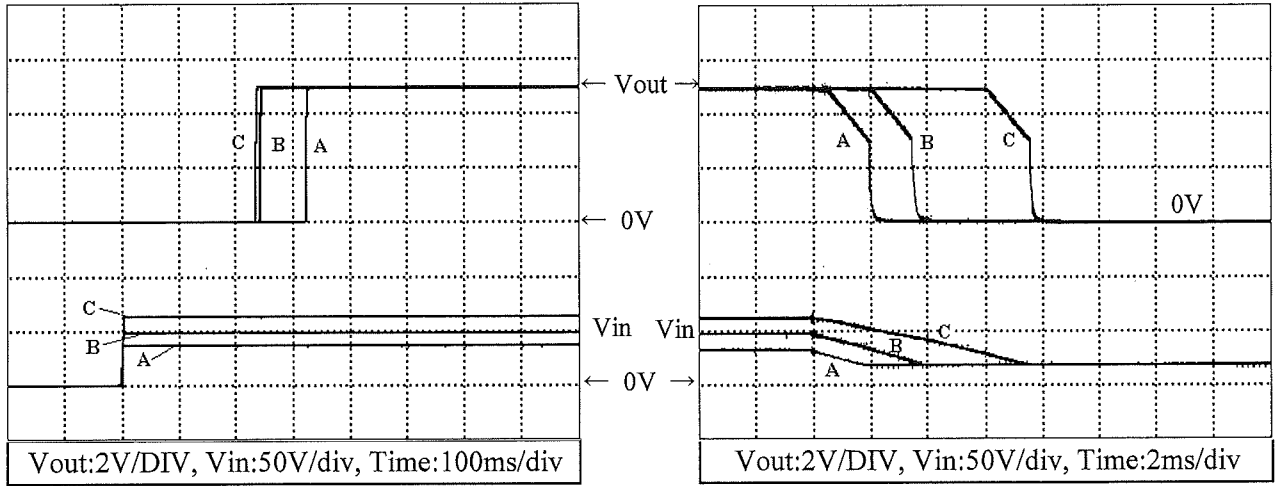
24V



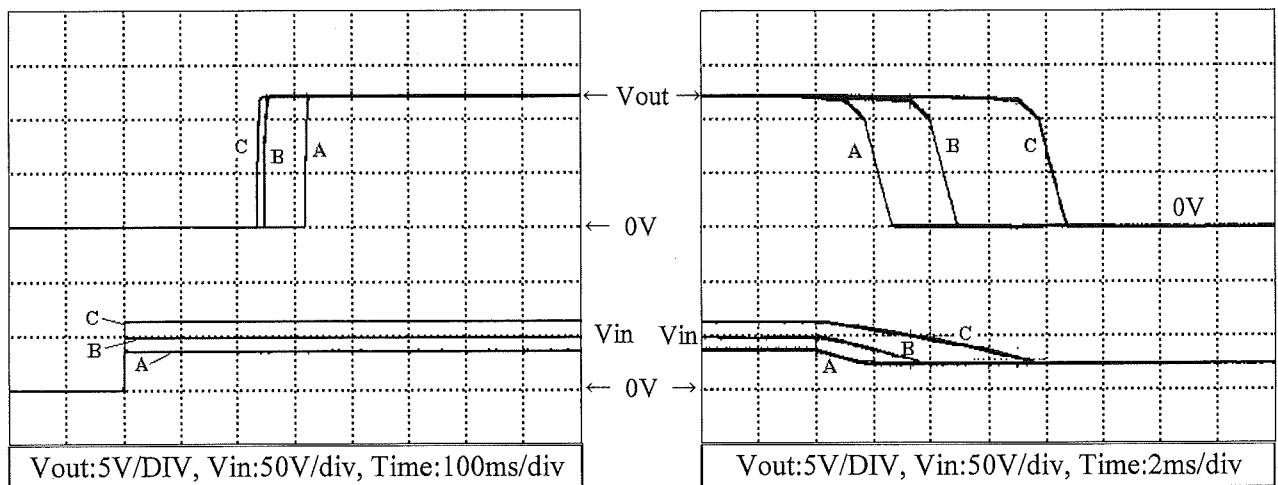
## 2.4 出力立ち上がり・立ち下がり特性 Output Rise / Fall Characteristics

Conditions Vin : 36 VDC (A)  
48 VDC (B)  
63 VDC (C)  
Iout : 100 %  
Ta : 25 °C

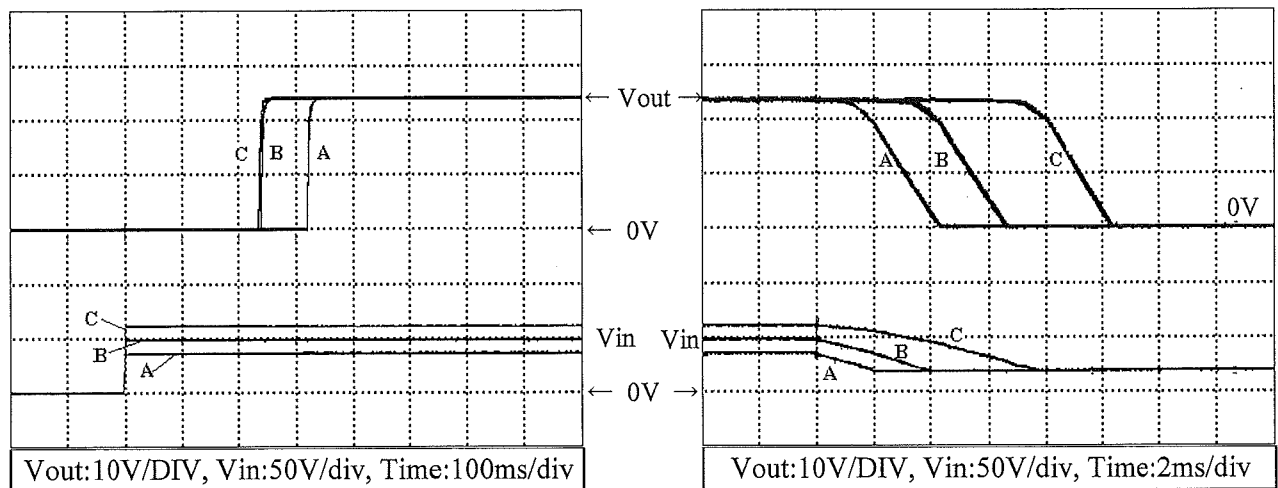
5V



12V



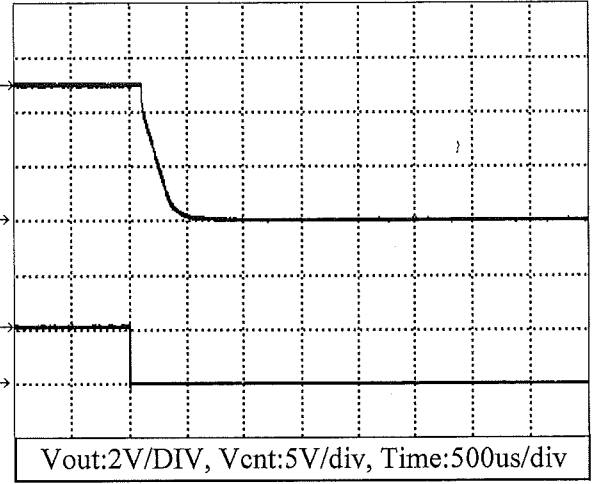
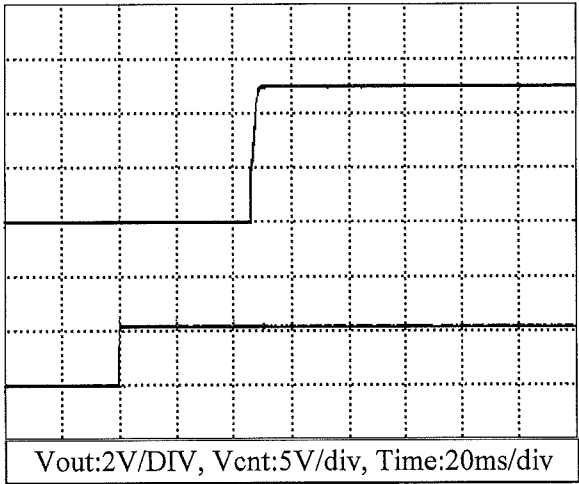
24V



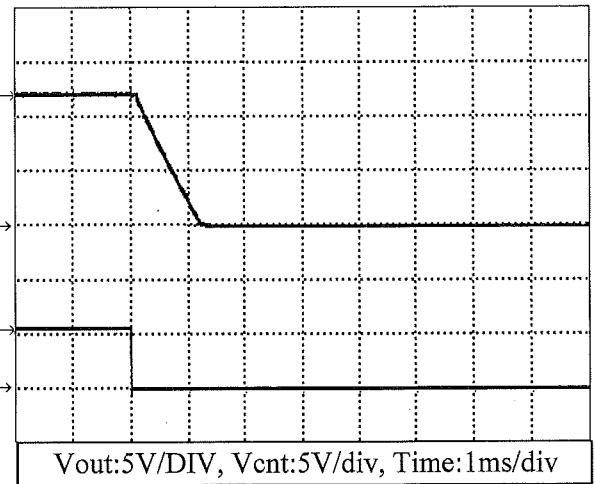
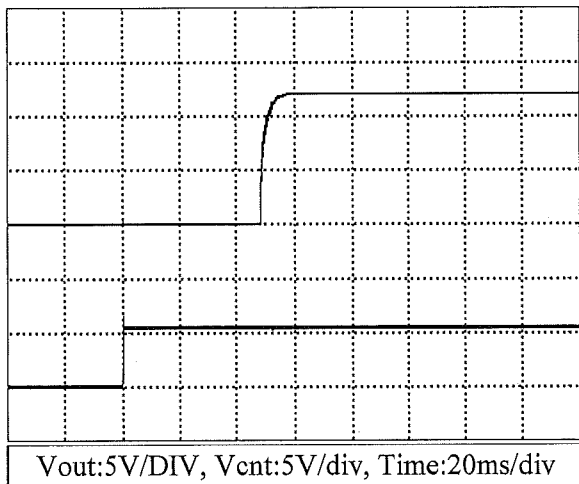
2.5 ON/OFF制御時 出力立ち上がり・立ち下がり特性  
Output Rise / Fall Characteristics with ON/OFF Control

Conditions Vin : 48 VDC  
Iout : 100 %  
Ta : 25 °C

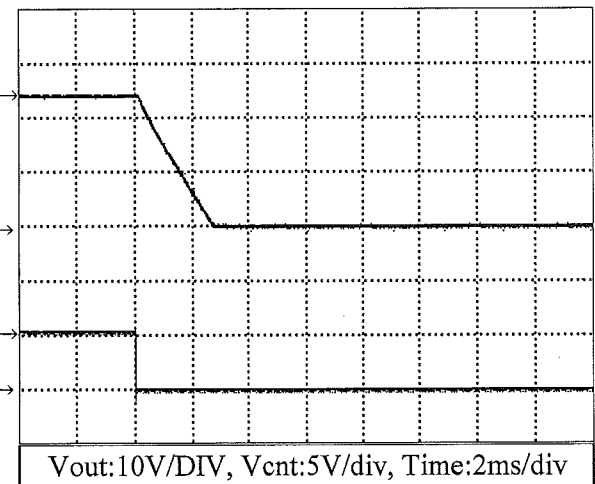
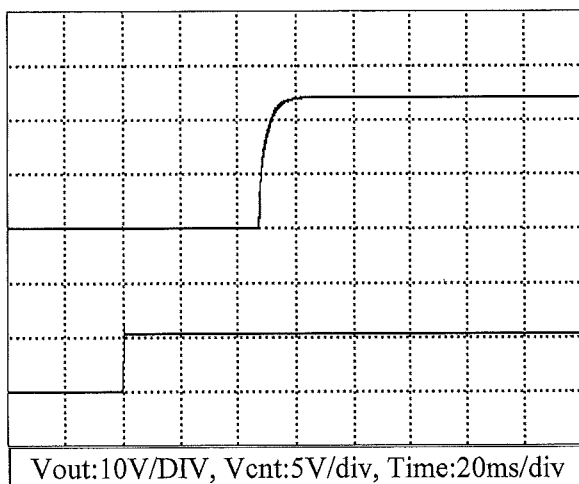
5V



12V



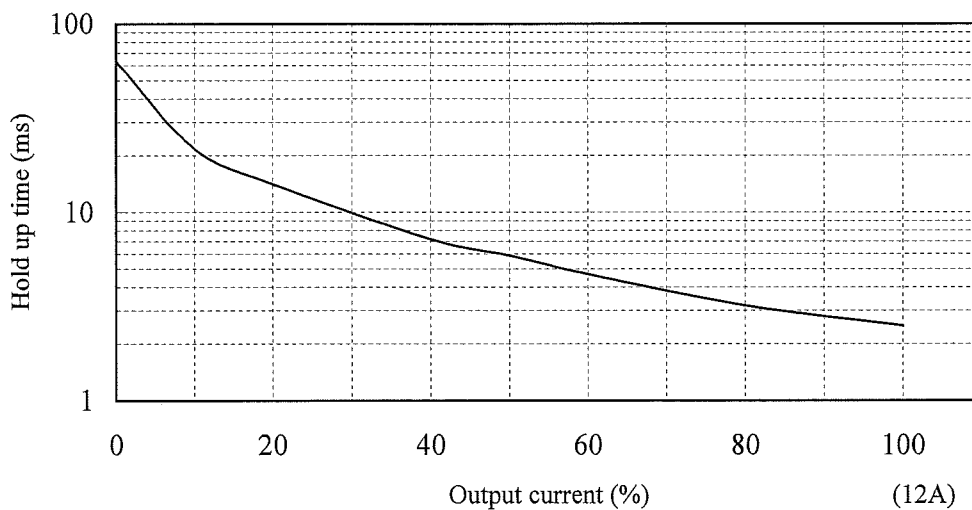
24V



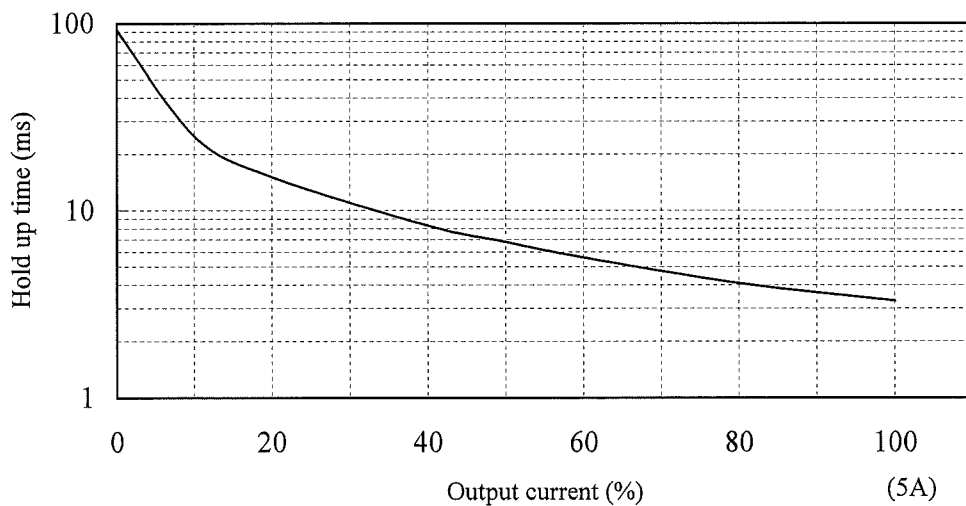
2.6 出力保持時間特性  
Hold up Time Characteristics

Conditions Vin : 48 VDC  
Ta : 25 °C

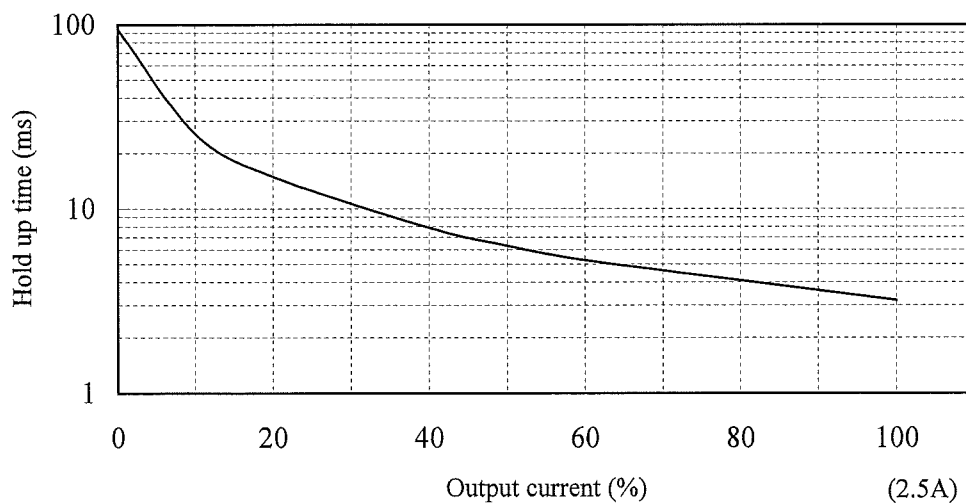
5V



12V

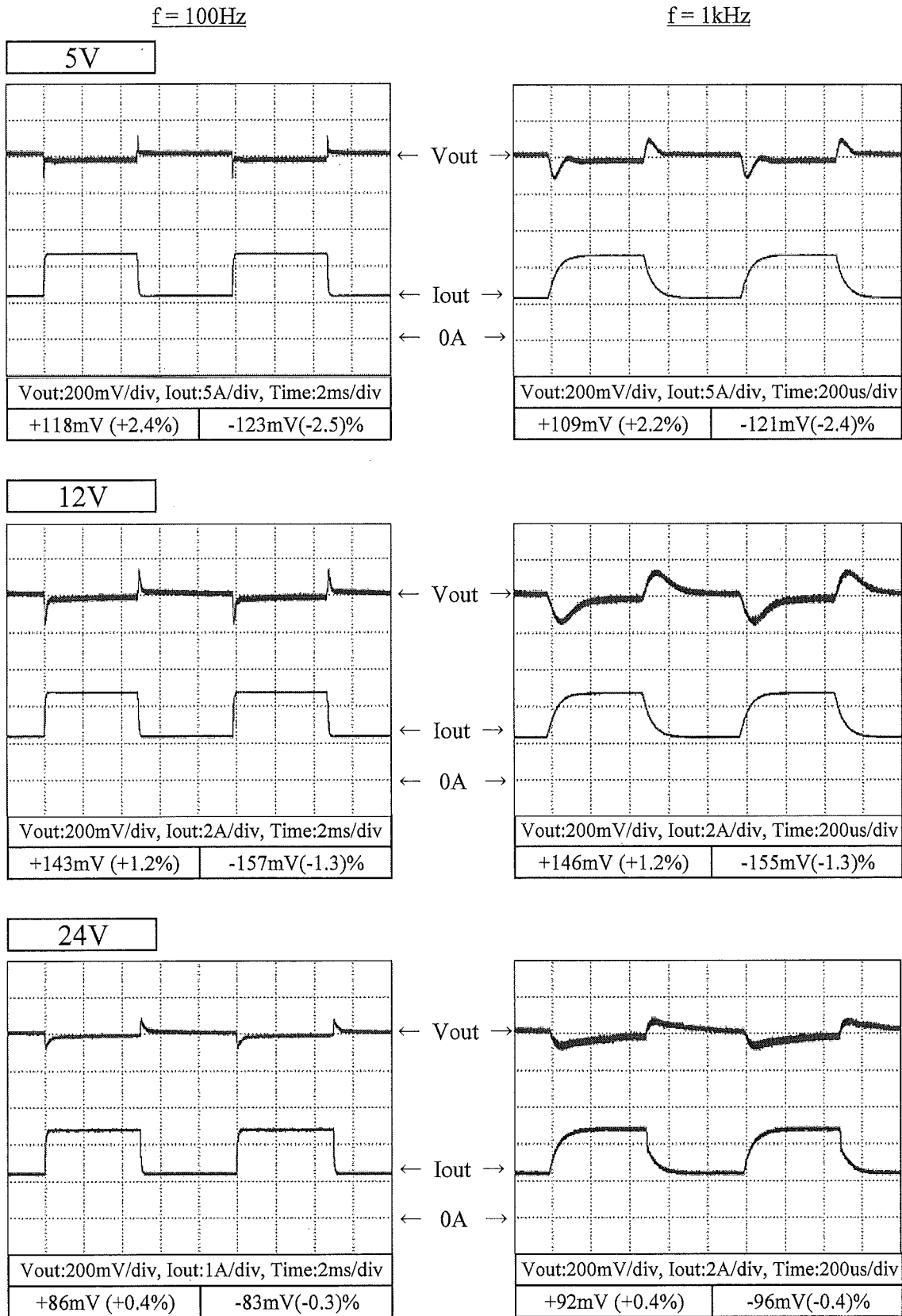


24V



2.7 過渡応答 (負荷急変) 特性  
Dynamic Load Response Characteristics

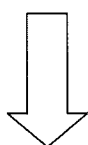
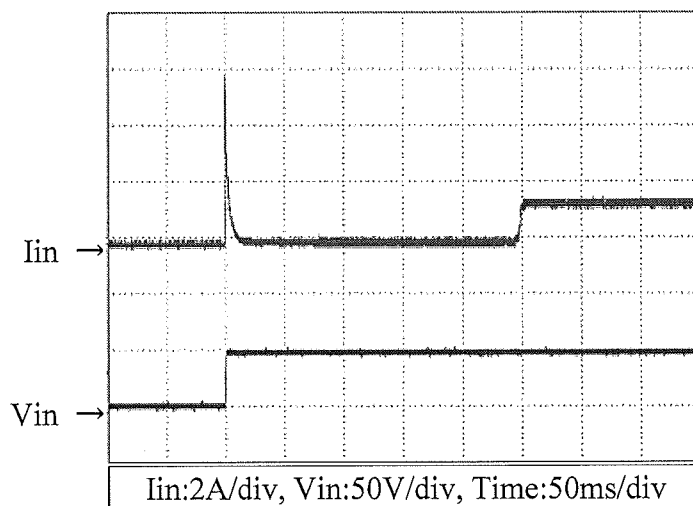
Conditions Vin : 48 VDC  
Io : 50% ↔ 100 %  
(tr = tf = 100us)  
Ta : 25 °C



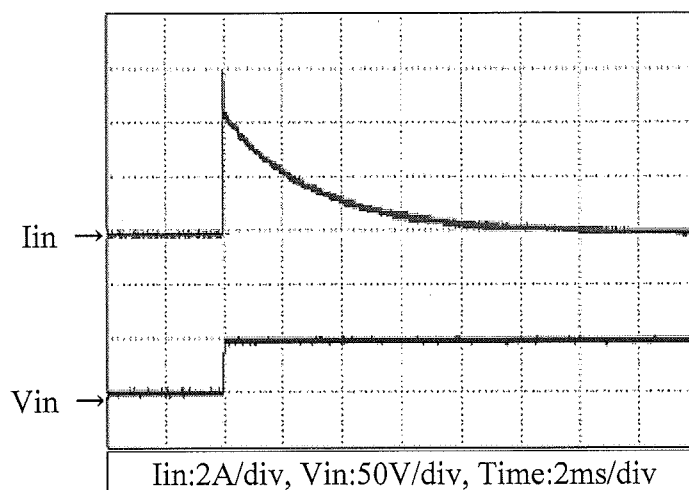
## 2.8 入力サージ電流 (突入電流) 特性 Inrush Current Characteristics

Conditions Vin : 48 VDC  
Iout : 100 %  
Ta : 25 °C

24V



時間軸拡大  
Time Axes Zoom in



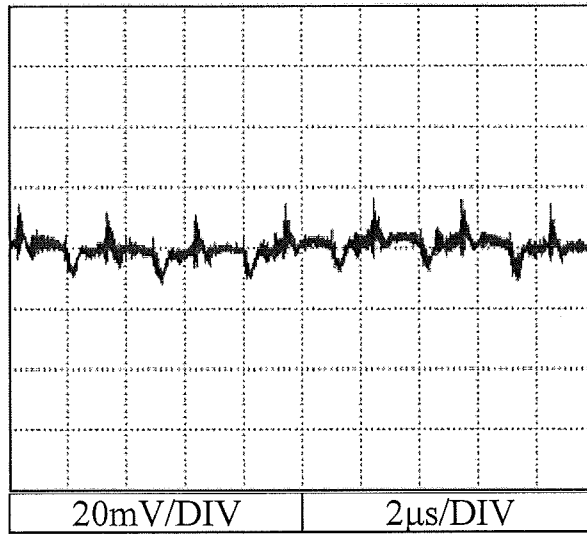
本特性は、いずれの出力電圧モデルにおいても同様となります。  
This characteristics is same for each output model.

2.9 出カリップル・ノイズ波形  
Output Ripple and Noise Waveform

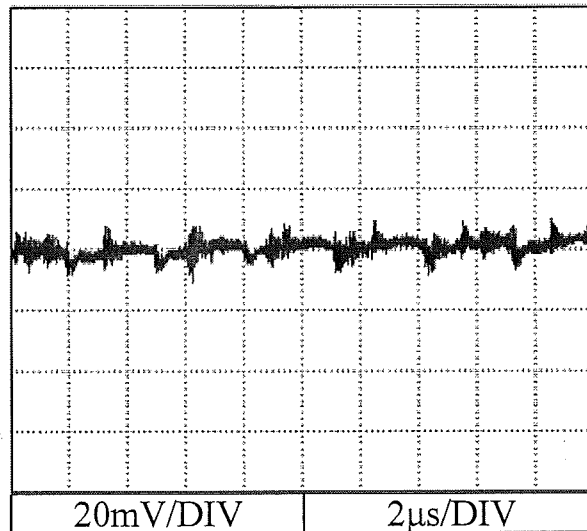
Conditions Vin : 48 VDC  
Iout : 100 %  
Ta : 25 °C

ノーマルモード  
NORMAL MODE

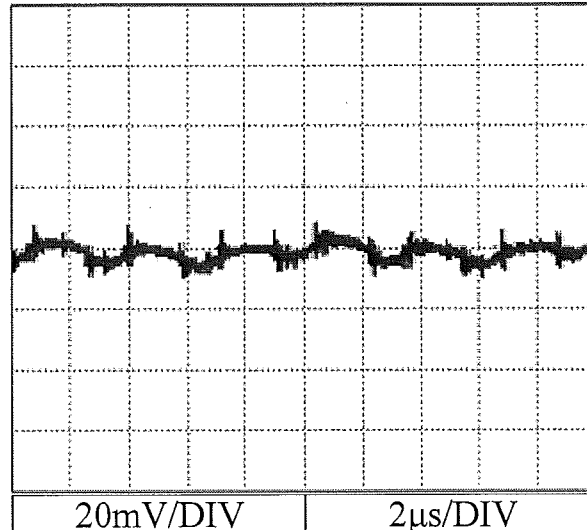
5V



12V



24V





2.10 EMI 特性

EMI Characteristics

雑音端子電圧

Conducted Emission Noise

Conditions

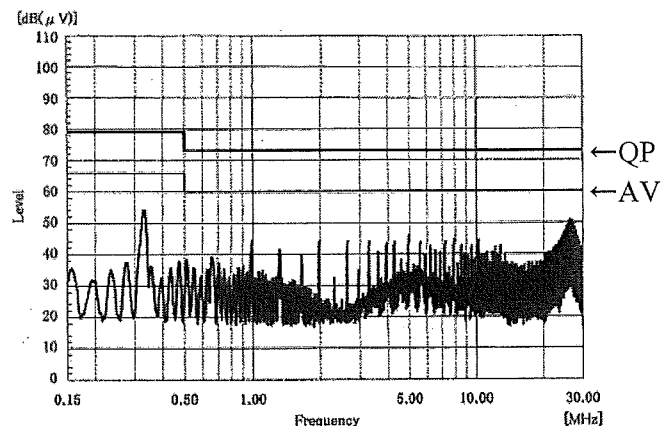
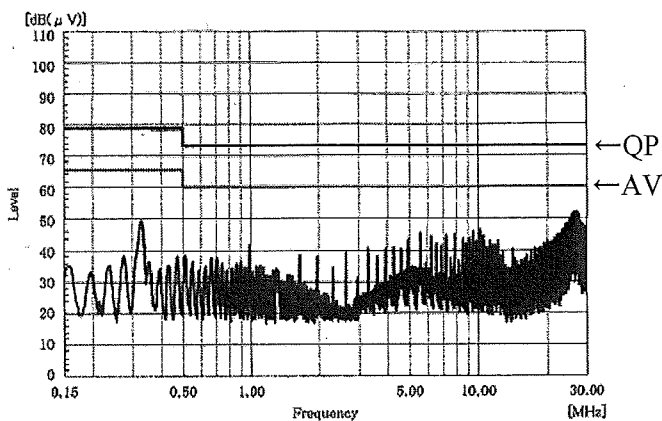
Vin : 48 VDC

Iout : 100 %

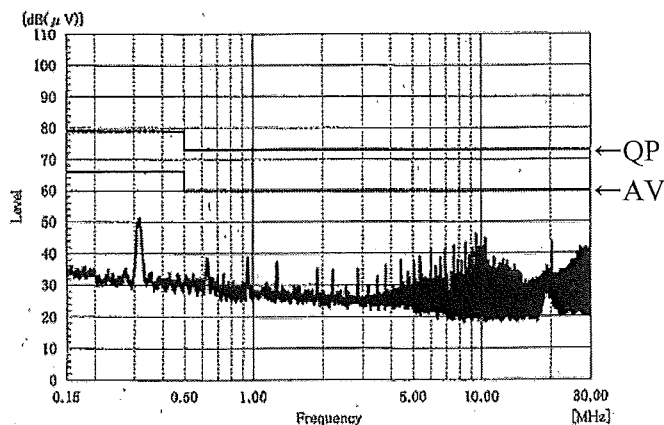
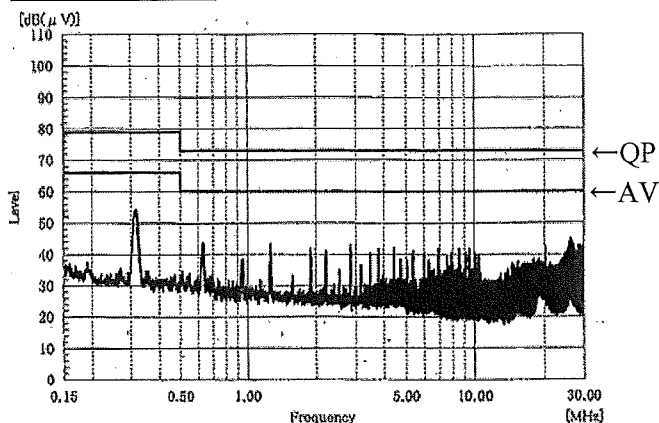
Phase : N (-Vin side)

Phase : L (+Vin side)

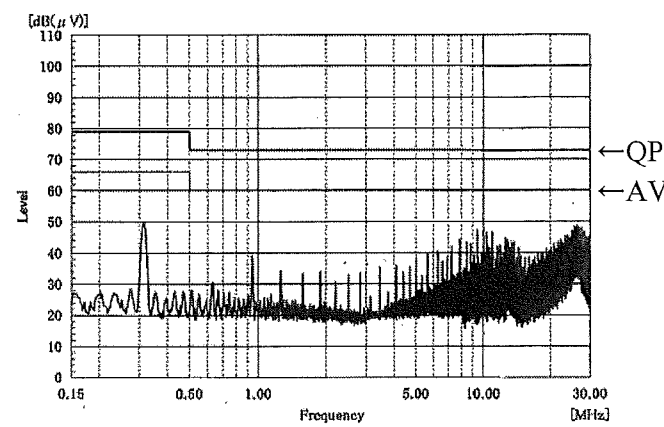
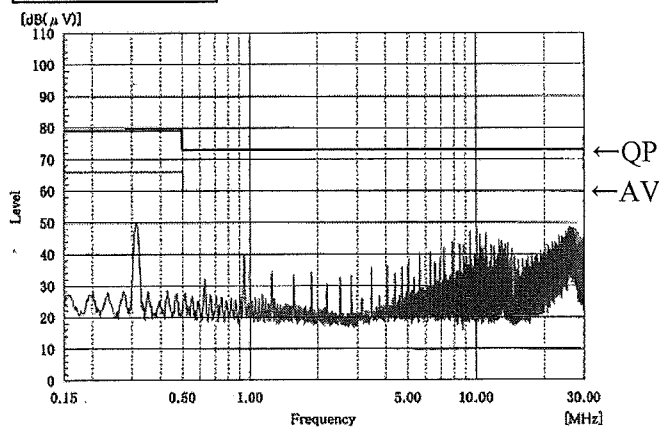
5V



15V



24V



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.

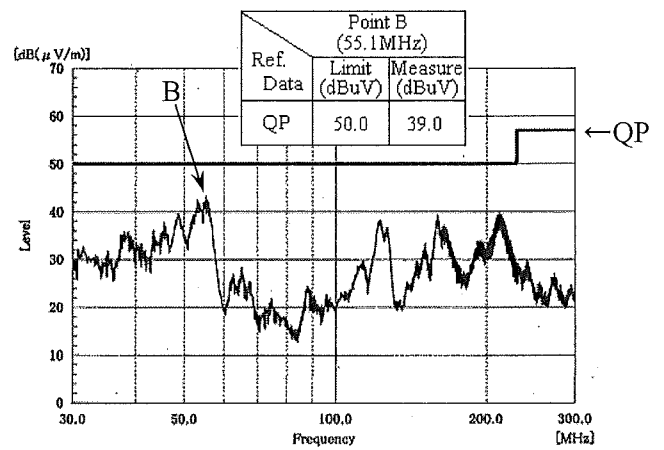
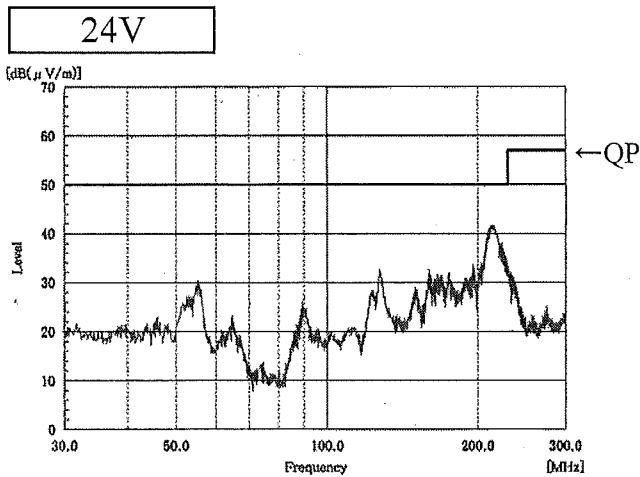
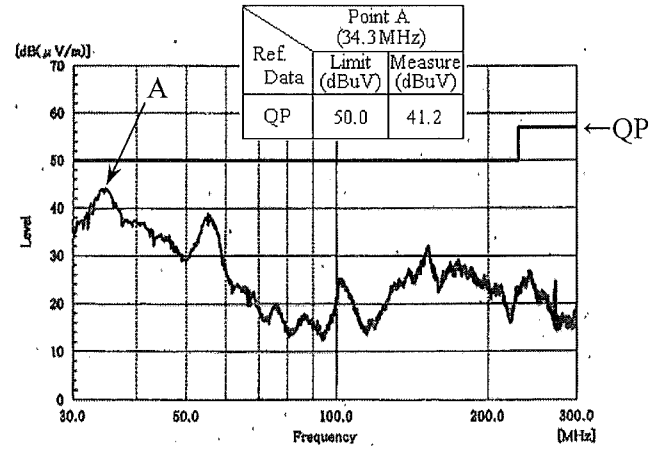
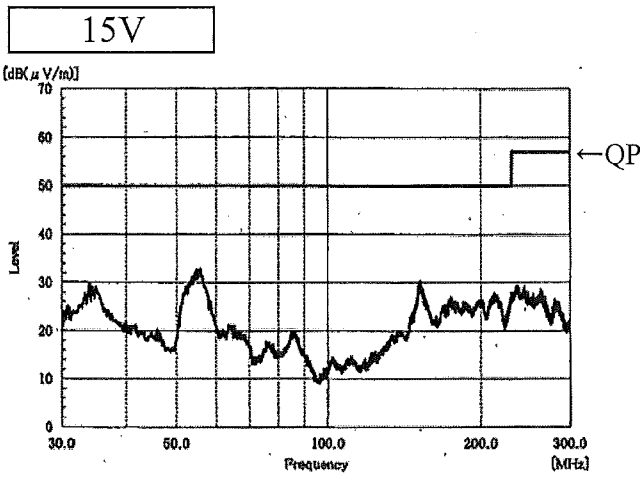
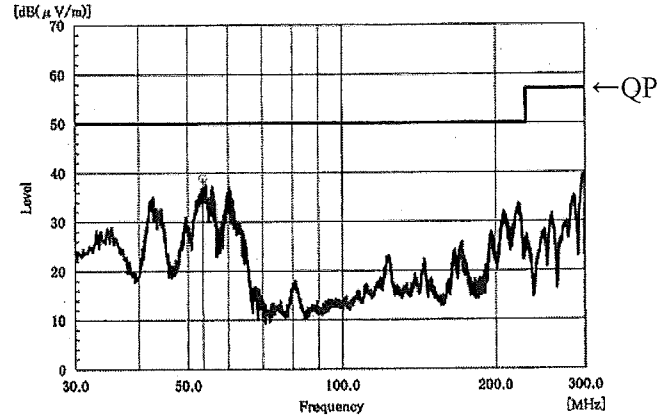
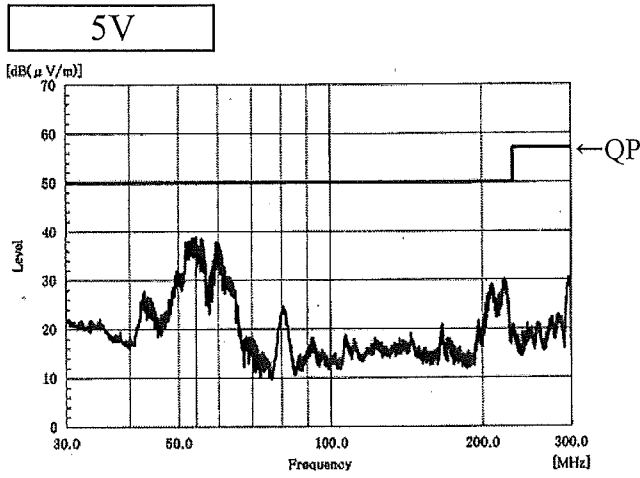
表示はピーク値です。  
Indication is peak values.

雑音電界強度  
Radiated Emission Noise

Conditions Vin : 48 VDC  
Iout : 100 %

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.