


PAH450S48-*

EVALUATION DATA

型式データ

DWG.NO. C247-53-01		
承認	査閲	担当
 23.Apr.'07	T. Ueno 23. Apr. '07	T. Tanaka 23. Apr. '07

DENSEI-LAMBDA

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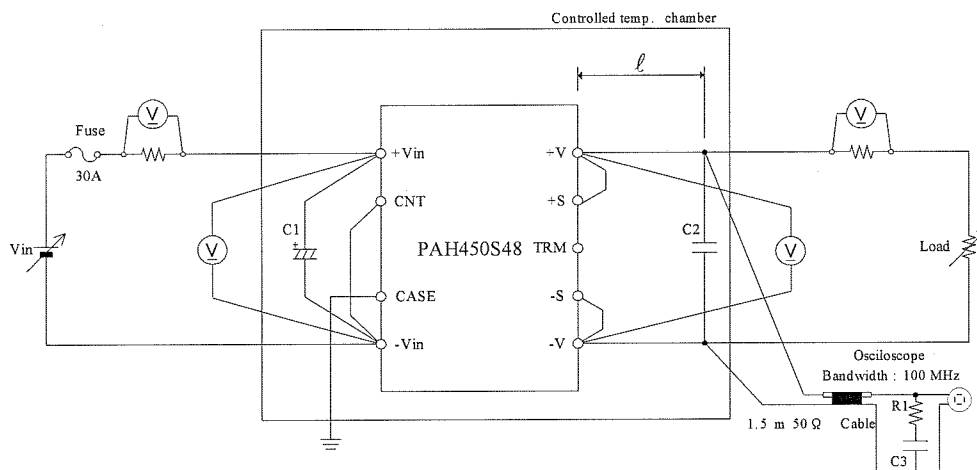
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使用記号 Terminology used

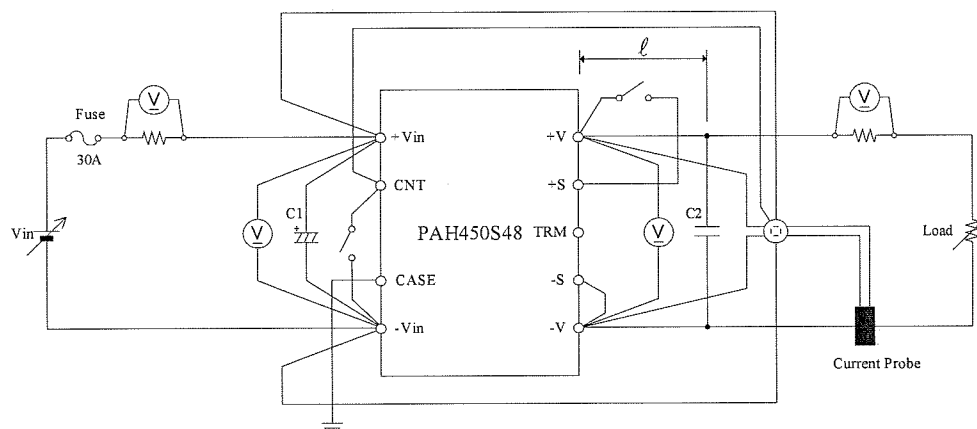
		Definition		
V_{in}	入力電圧		Input voltage
V_o	出力電圧		Output voltage
I_{in}	入力電流		Input current
I_o	出力電流		Output current
T_{bp}	ベースプレート温度		Baseplate temperature

1. 測定方法 Evaluation Method
 1.1 測定回路 Measurement Circuits

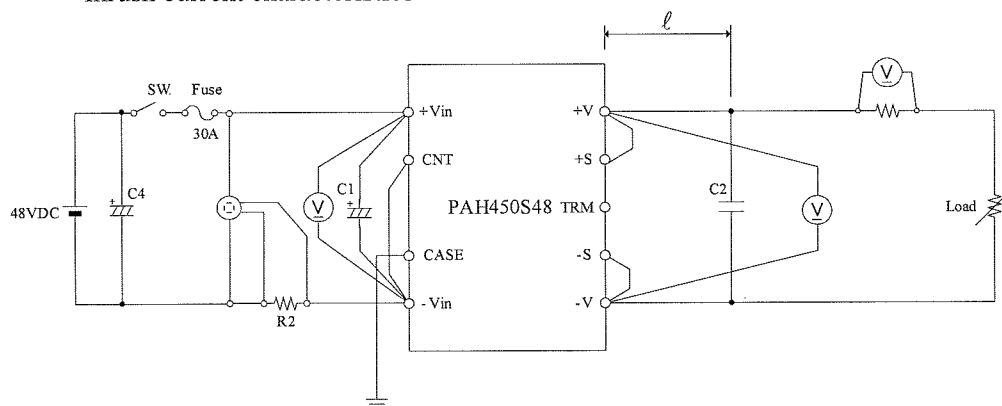
- (1) 静特性、過電流保護特性、出力リップル、ノイズ波形
 Steady state characteristics, Over current protection (OCP) characteristics and Output ripple and noise waveform



- (2) 過渡応答、過電圧保護特性、その他
 Dynamic response, Over voltage protection (OVP) characteristics and Other characteristics



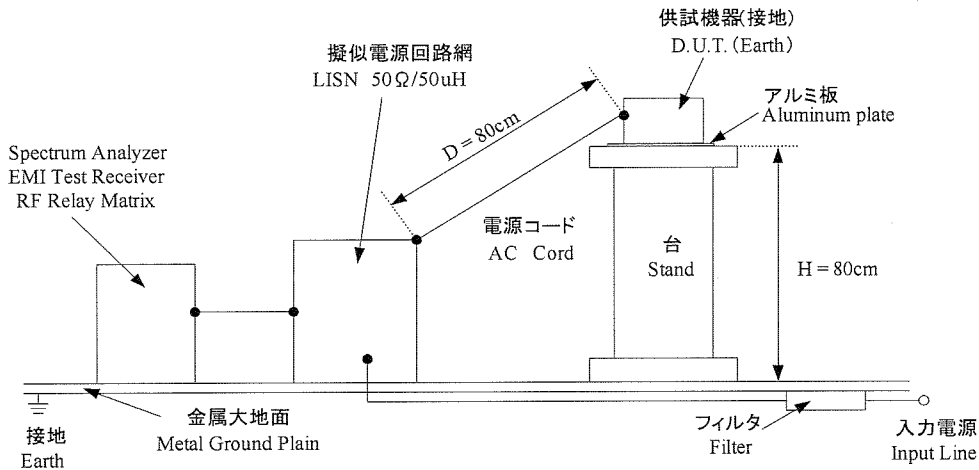
- (3) 入力サージ電流（突入電流）特性
 Inrush current characteristics



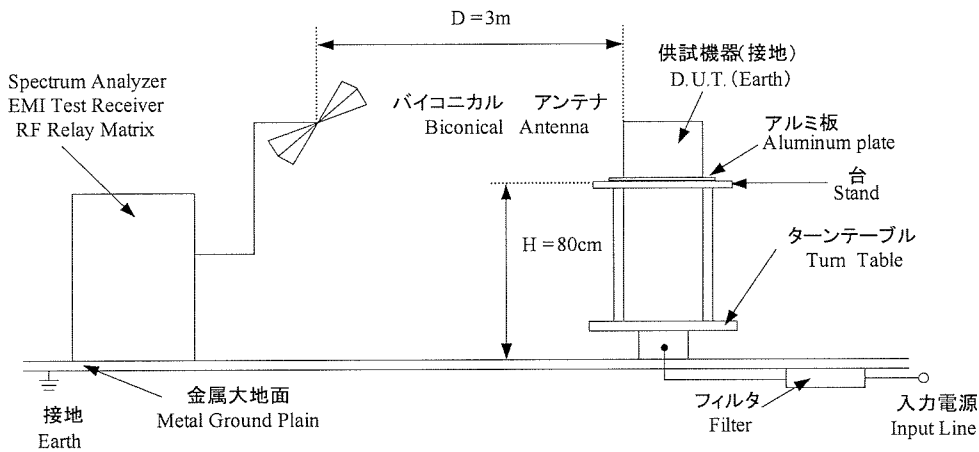
- | | |
|--|------------------------------------|
| C1 : 100uF Electrolytic Capacitor | C4 : 8000uF Electrolytic Capacitor |
| C2 : 28V-22uF x4parallel Ceramic Capacitor | R1 : 50Ω |
| : 48V-4.7uF x6parallel Ceramic Capacitor | R2 : 0.01Ω |
| C3 : 4700pF Ceramic Capacitor | l : 50mm |

(4) EMI特性 Electro-Magnetic Interference characteristics

(a) 雑音端子電圧 (帰還ノイズ) Conducted Emission Noise



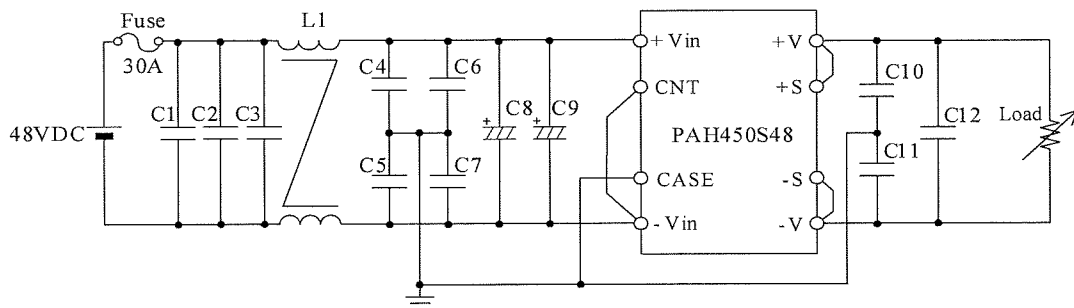
(b) 雑音電界強度 (輻射ノイズ) Radiated Emission Noise



* Shielded cable used to input and output cable.

VCCI class A対応アプリケーションシステム

VCCI class A application system



- C1-C3 : 2.2μF Ceramic Capacitor
- C4, C5 : 0.22μF Film Capacitor
- C6, C7 : 4700pF Film Capacitor
- C8, C9 : 220μF Electrolytic Capacitor

- C10, C11 : 0.47μF Film Capacitor
- C12 : 28V-22μF x4parallel Ceramic Capacitor
: 48V-4.7μF x6parallel Ceramic Capacitor
- L1 : 80μH

1.2 使用測定機器 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	OSCILLOSCOPE	TEKTRONIX	TDS3012
2	DIGITAL STORAGE OSCILLOSCOPE	IWATSU	DS-4354M
3	DATA ACQUISITION / SWITCH UNIT	AGILENT	34970A
4	CURRENT PROBE	LECROY	AP015
5	SHUNT RESISTER	YOKOGAWA ELECT.	2215
6	CONTROLLED TEMP. CHAMBER	ESPEC CORP.	SU-261
7	SPECTRUM ANALYZER	ROHDE & SCHWARZ	FSA
8	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESHS10
9	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESVS10
10	RF RELAY MATRIX	ROHDE & SCHWARZ	PSU
11	AMN	KYORITU DENSHI	KNW-242
12	ANTENNA(BICONICAL ANTENNA)	SCHWARZBECK	BBA9106
13	DYNAMIC DUMMY LOAD	TAKASAGO	FK-1000L
14	AC POWER SUPPLY	TAKASAGO	AA-2000XG

2. 特性データ Characteristics

2.1 静特性 Steady state data

(1) 入力・負荷・温度変動 Regulation - line and load, Temperature drift

28V

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

Io \ Vin	36VDC	48VDC	76VDC	Line regulation	
0%	28.030V	28.032V	28.030V	1mV	0.005%
50%	28.031V	28.031V	28.030V	1mV	0.004%
100%	28.040V	28.036V	28.034V	6mV	0.021%
Load regulation	9mV	5mV	4mV		
	0.034%	0.019%	0.015%		

2. Temperature drift

Conditions Vin : 48VDC

Io : 100%

Tbp	-40°C	+25°C	+100°C	Temperature stability	
Vo	28.037V	28.036V	27.932V	105mV	0.376%

48V

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

Io \ Vin	36VDC	48VDC	76VDC	Line regulation	
0%	47.996V	47.996V	47.995V	2mV	0.003%
50%	47.996V	47.995V	47.994V	2mV	0.004%
100%	47.998V	47.997V	47.996V	2mV	0.004%
Load regulation	2mV	2mV	2mV		
	0.004%	0.005%	0.005%		

2. Temperature drift

Conditions Vin : 48VDC

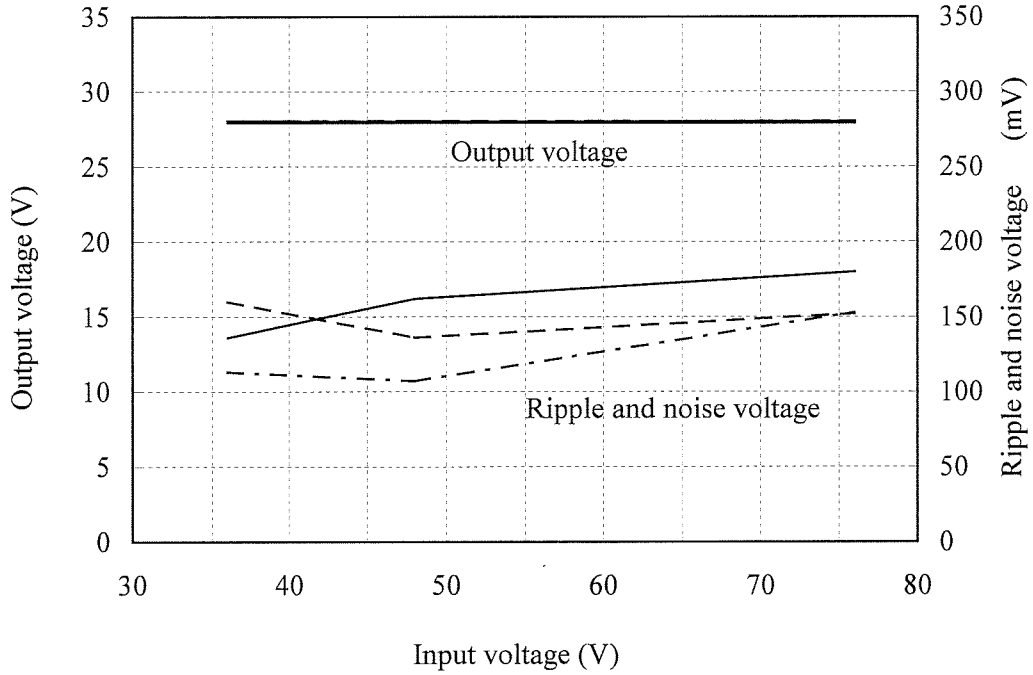
Io : 100%

Tbp	-40°C	+25°C	+100°C	Temperature stability	
Vo	48.033V	47.997V	47.883V	150mV	0.312%

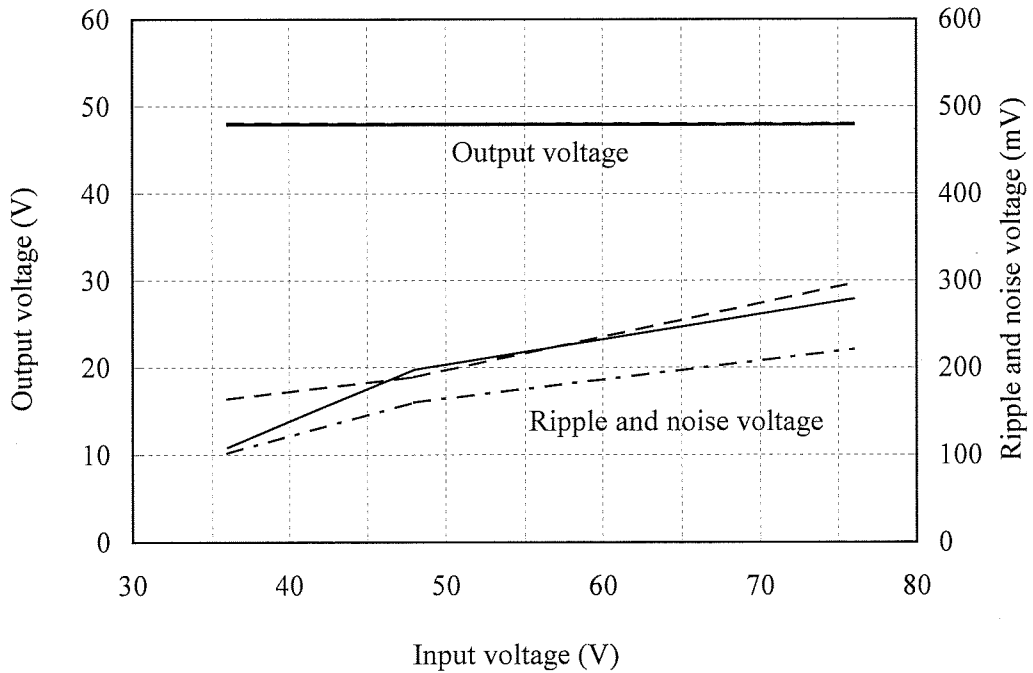
(2) 出力電圧・出力リップル、ノイズ電圧 対 入力電圧
 Output voltage and ripple voltage vs. Input voltage

Conditions Io : 100 %
 Tbp : -40 °C -----
 : 25 °C - · - · -
 : 100 °C _____

28V



48V

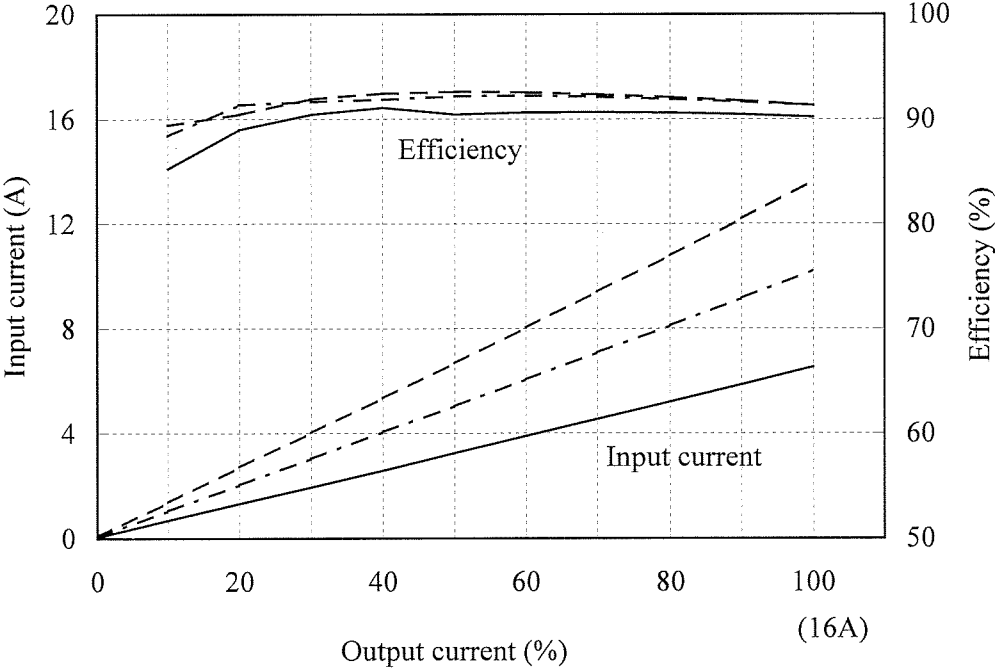


(3) 入力電流・効率 対 出力電流

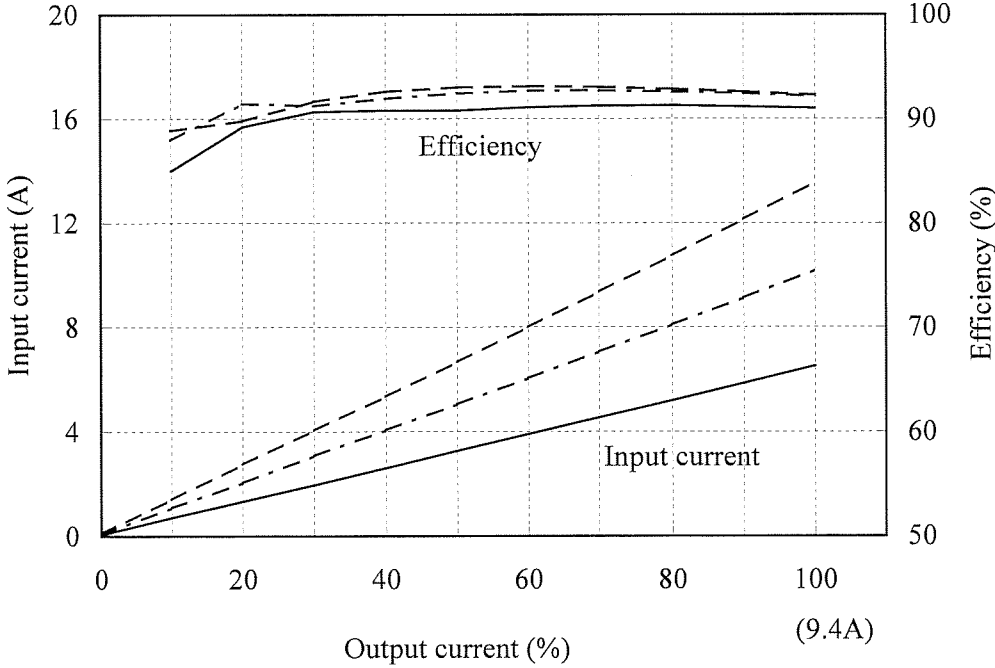
Input current and Efficiency vs. Output current

Conditions Vin : 36 VDC ---
: 48 VDC - - - -
: 76 VDC ———
Tbp : 25 °C

28V



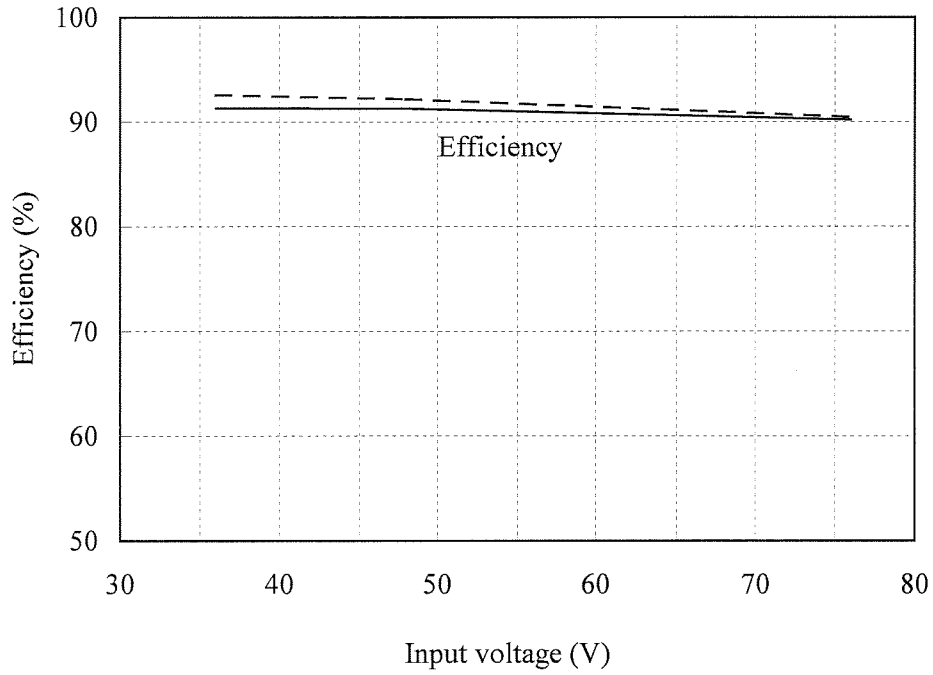
48V



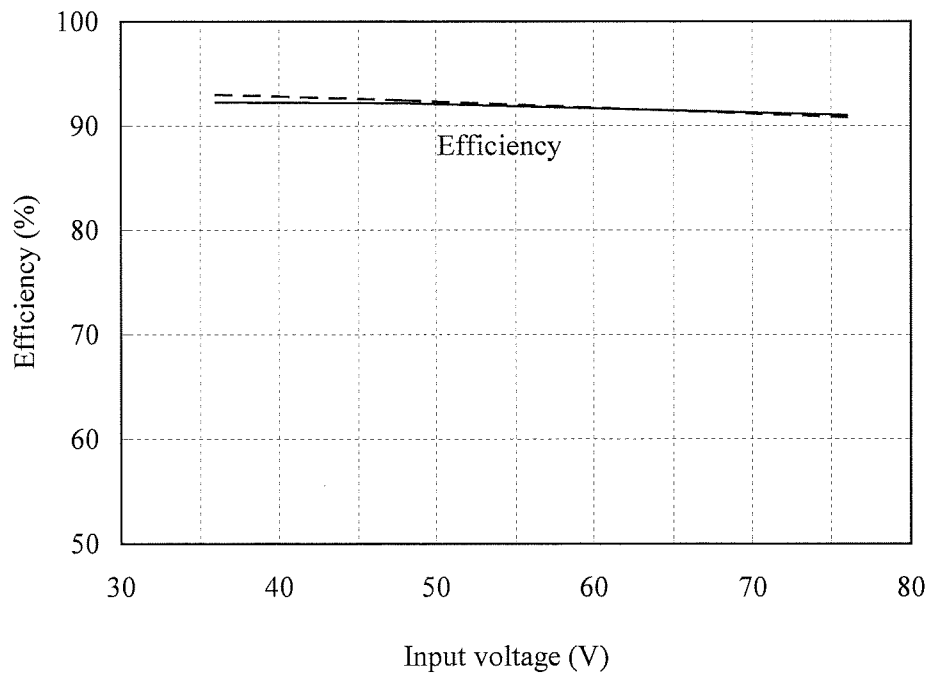
(4) 効率 対 入力電圧
Efficiency vs. Input voltage

Conditions Io : 50 % ----
 : 100 % ——
Tbp : 25 °C

28V



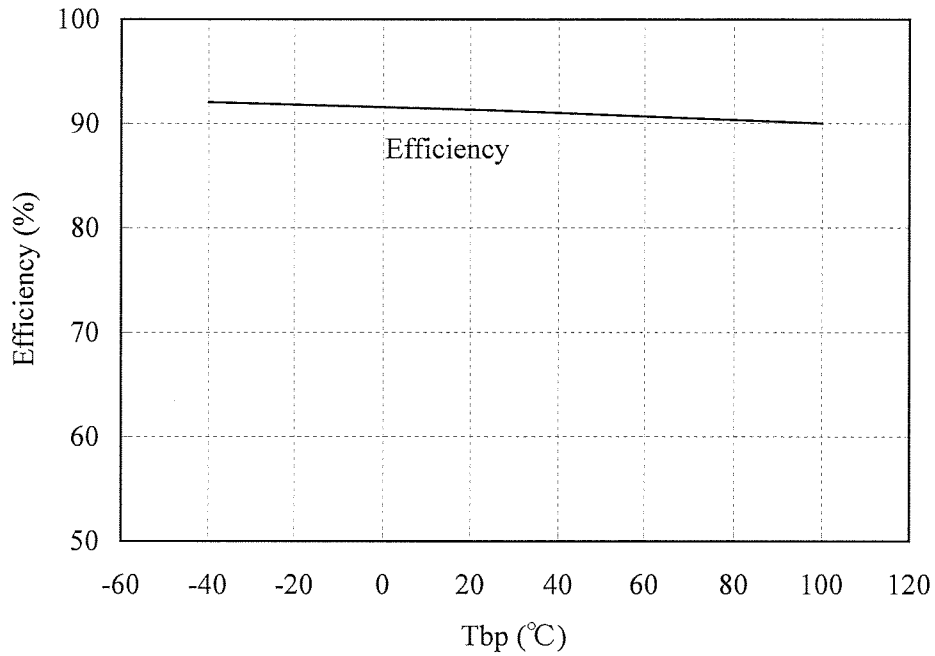
48V



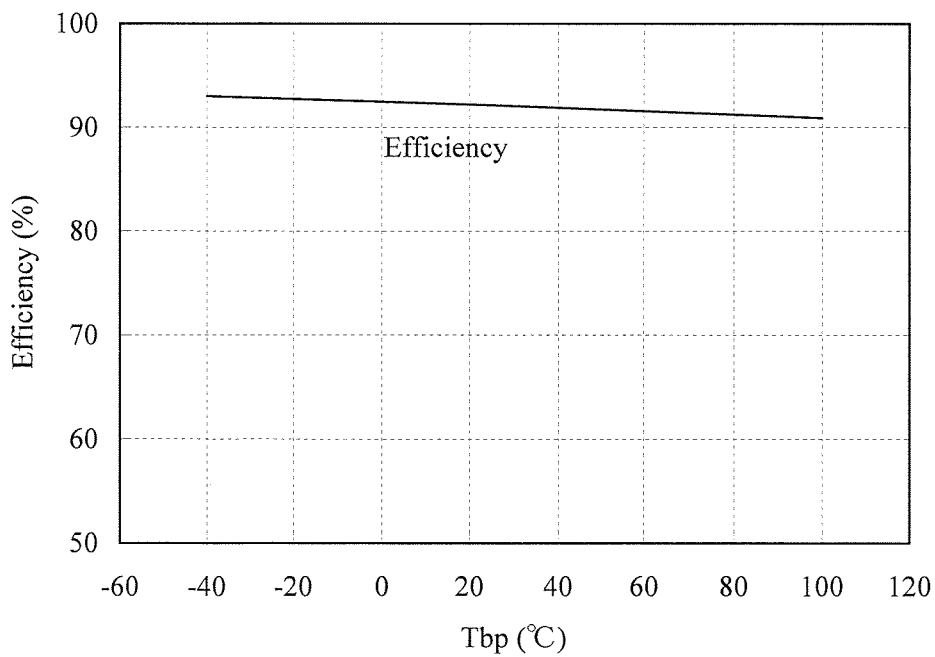
(5) 効率 対 ベースプレート温度
Efficiency vs. Baseplate temperature

Conditions Vin : 48 VDC
Io : 100 %

28V



48V



(6) 起動・停止電圧特性

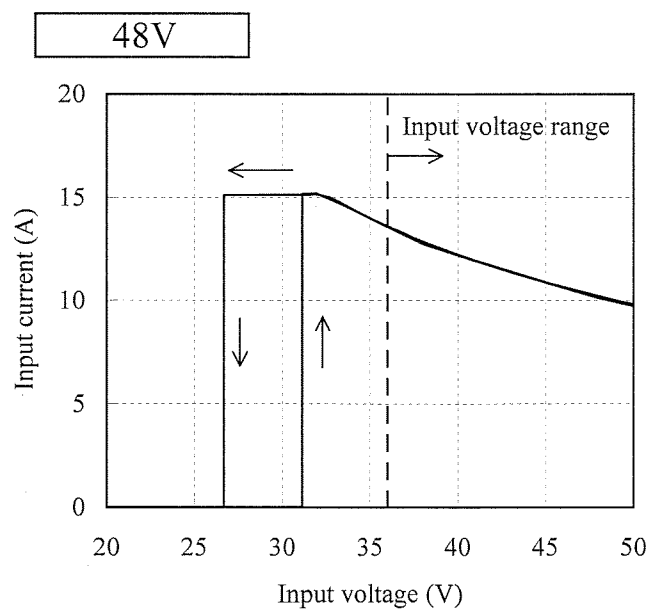
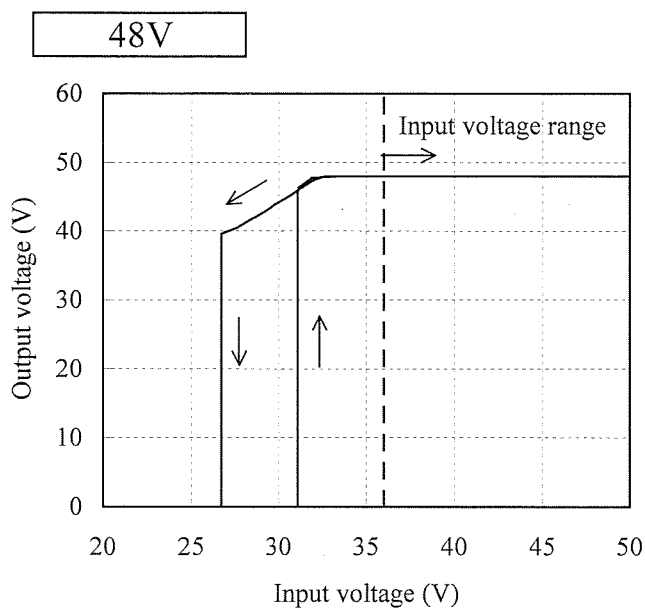
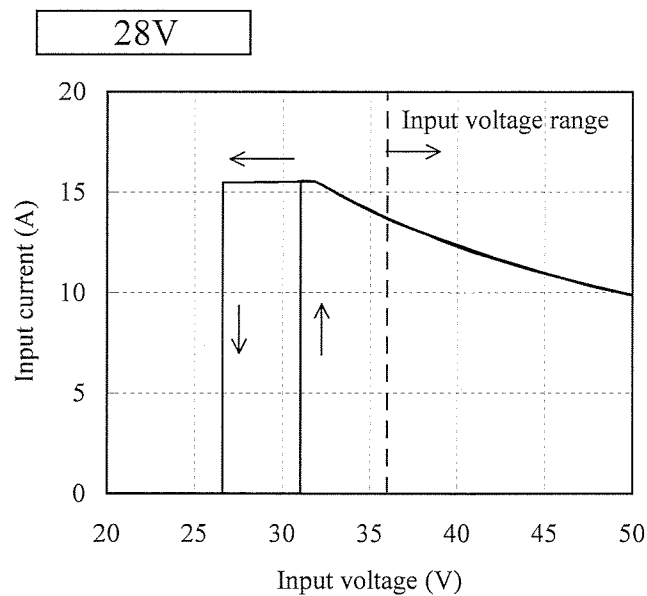
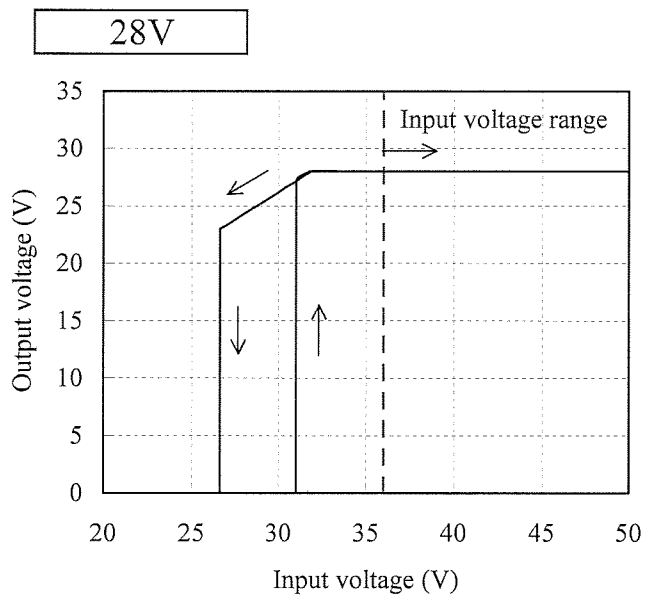
Start and Stop voltage characteristics

出力電圧 対 入力電圧

Output voltage vs. Input voltage

Conditions I_o : 100 %

T_{bp} : 25 °C

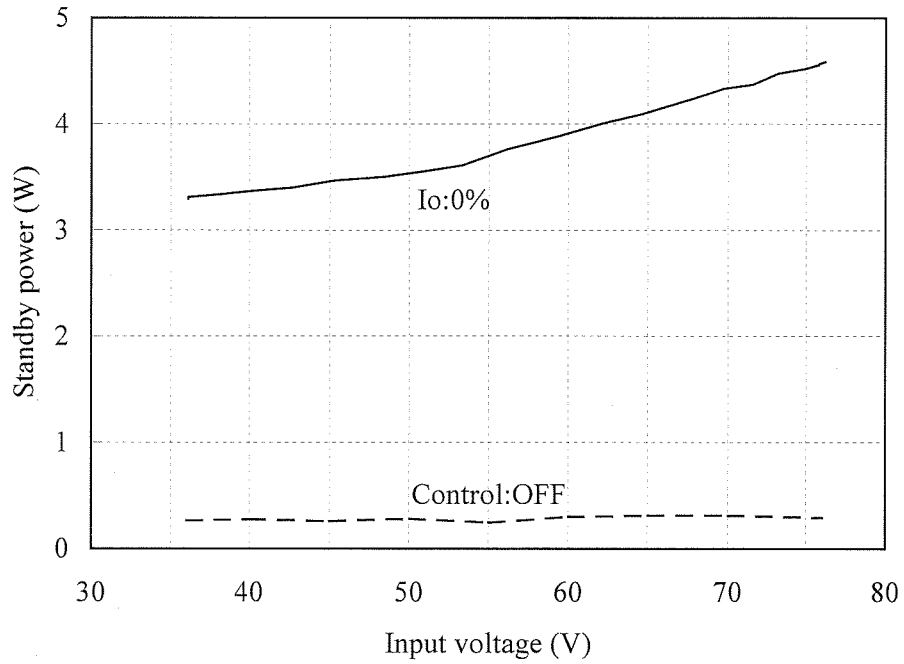


2.2 待機電力特性

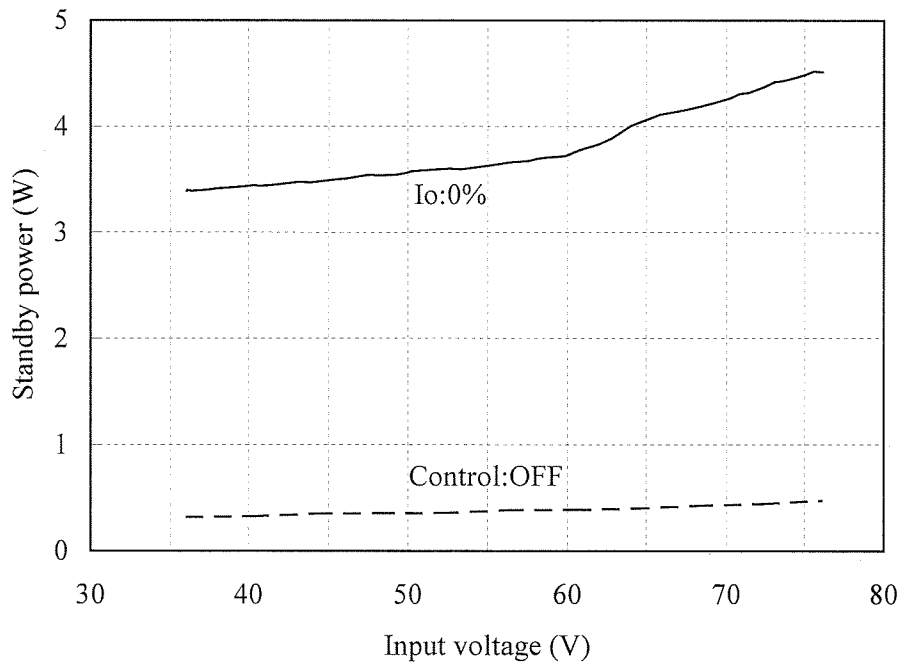
Standby power characteristics

Conditions Tbp : 25 °C

28V



48V



2.3 通電ドリフト特性

Warm up voltage drift characteristics

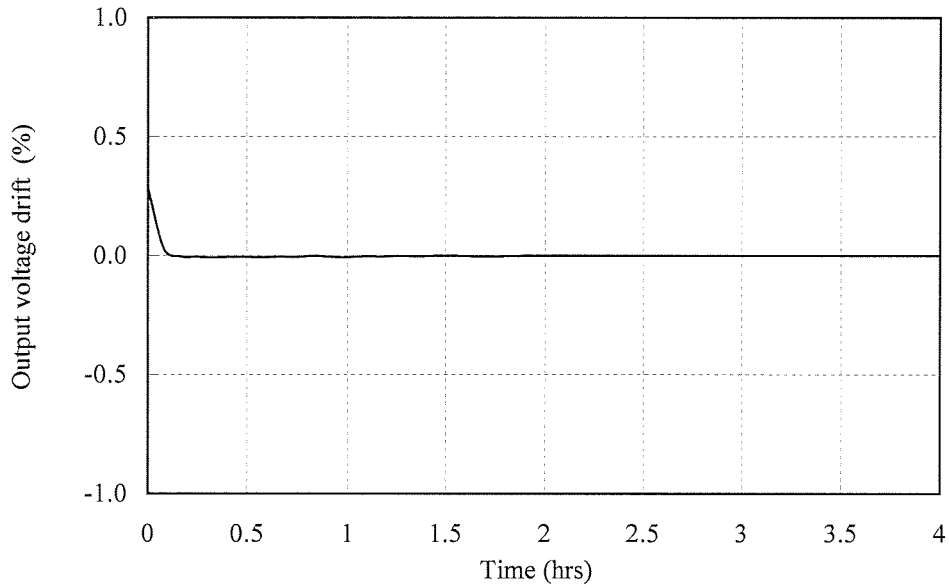
Conditions

Vin : 48 VDC

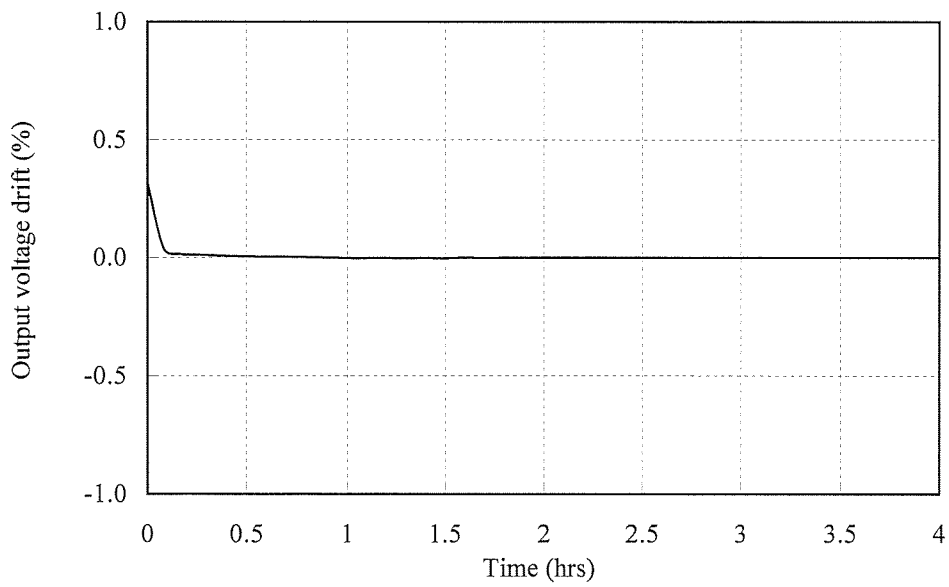
Io : 100 %

Ta : 25 °C

28V



48V



2.4 過電流保護特性

Over current protection (OCP) characteristics

入力電圧依存性

Input voltage dependence

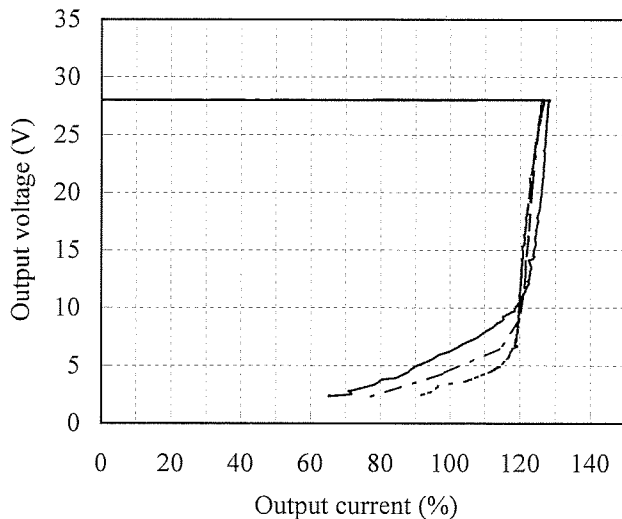
Conditions Vin : 36 VDC -----
 : 48 VDC - - - - -
 : 76 VDC ————
 Tbp : 25 °C

ベースプレート温度依存性

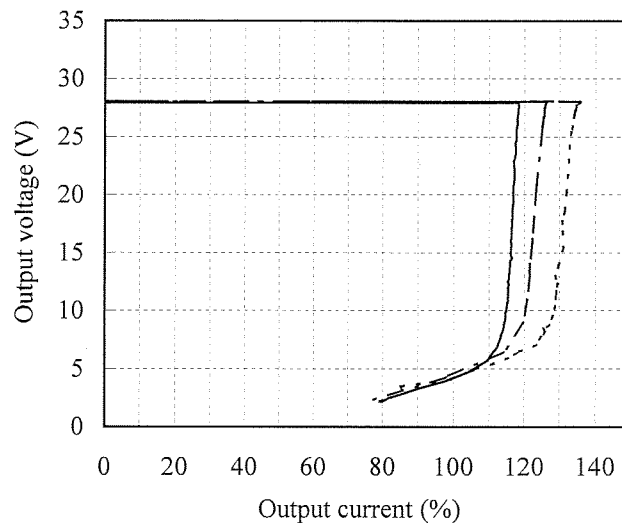
Baseplate temperature dependence

Conditions Vin : 48 VDC
 Tbp : -40 °C -----
 : 25 °C - - - - -
 : 100 °C ————

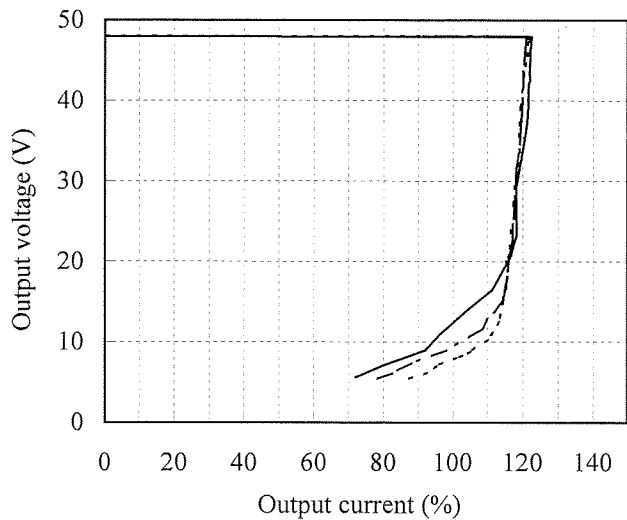
28V



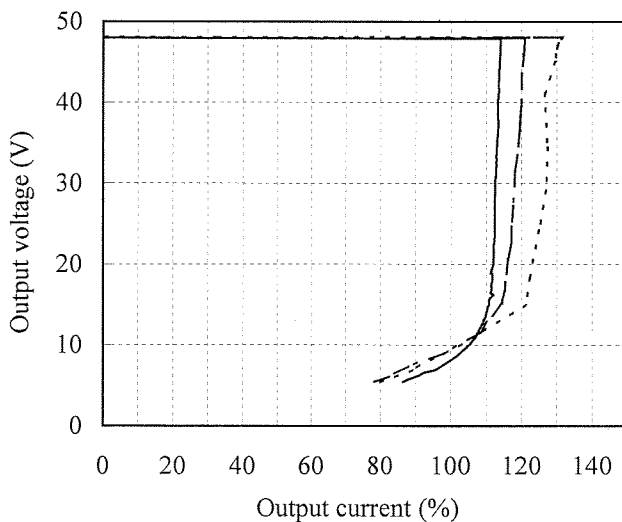
28V



48V



48V



2.5 過電圧保護特性

Over voltage protection (OVP) characteristics

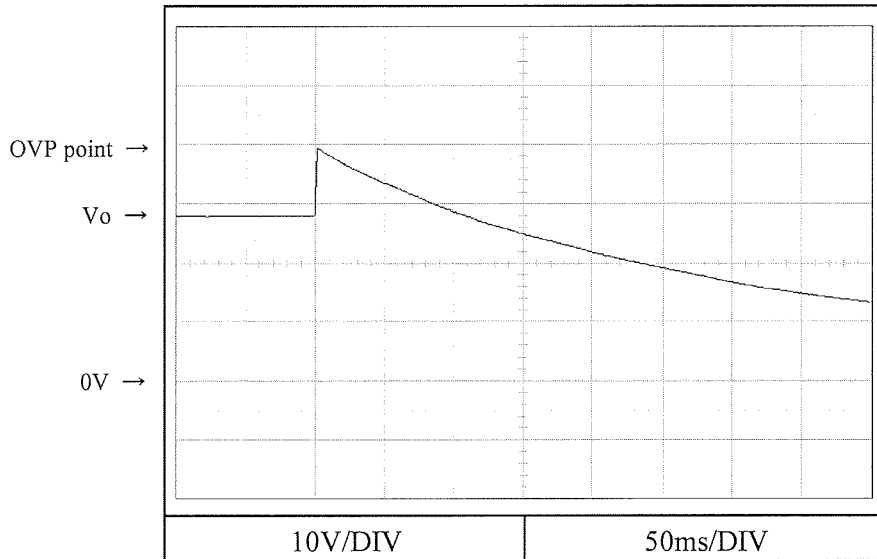
Conditions

Vin : 48 VDC

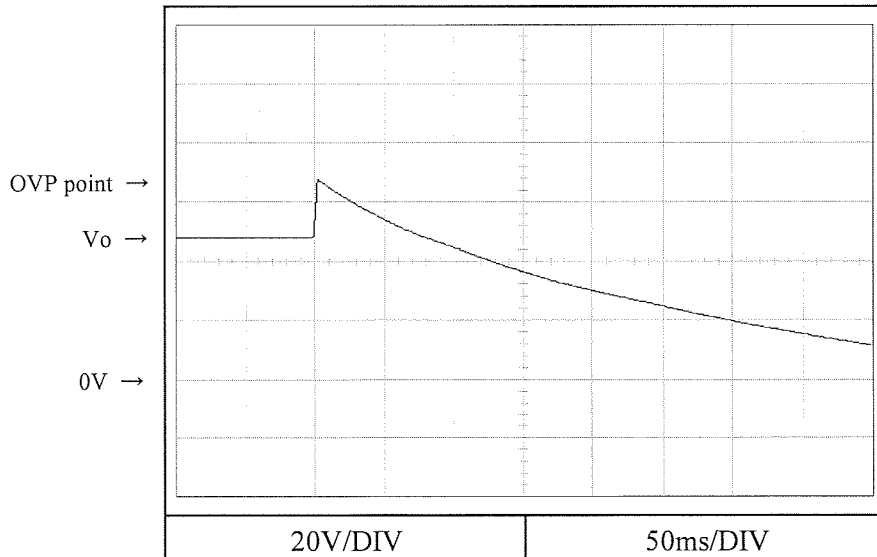
Io : 0 %

Tbp : 25 °C

28V



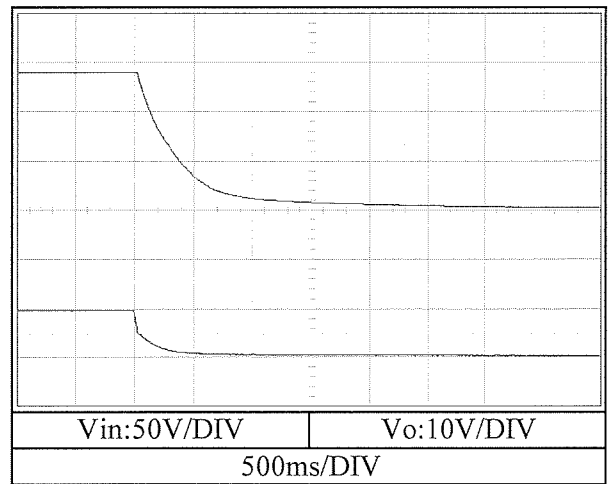
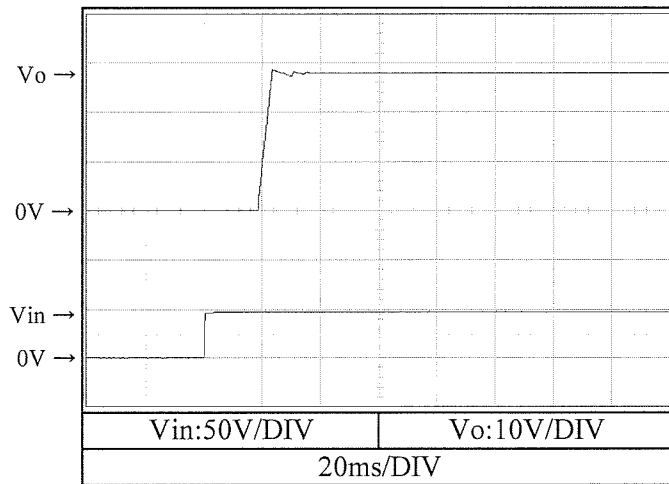
48V



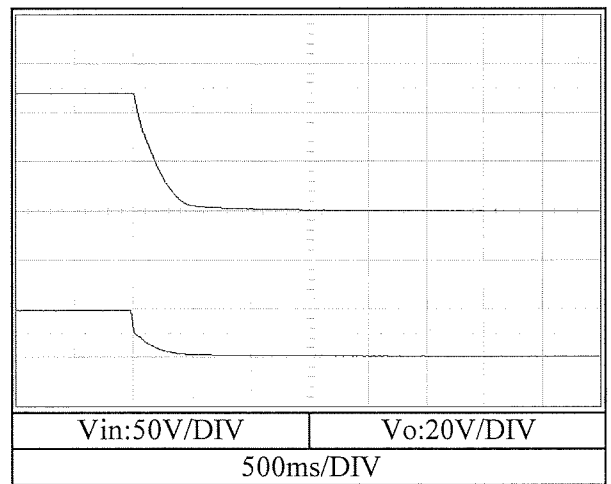
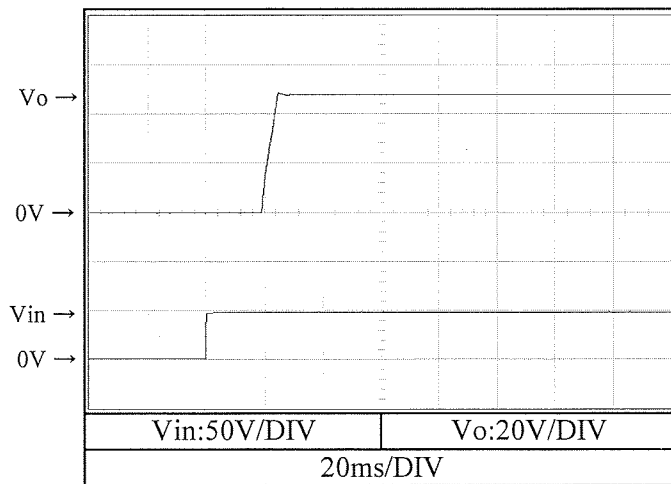
2.6 出力立ち上がり、立ち下り特性
Output rise and fall characteristics

Conditions Vin : 48 VDC
Io : 0 %
Tbp : 25 °C

28V



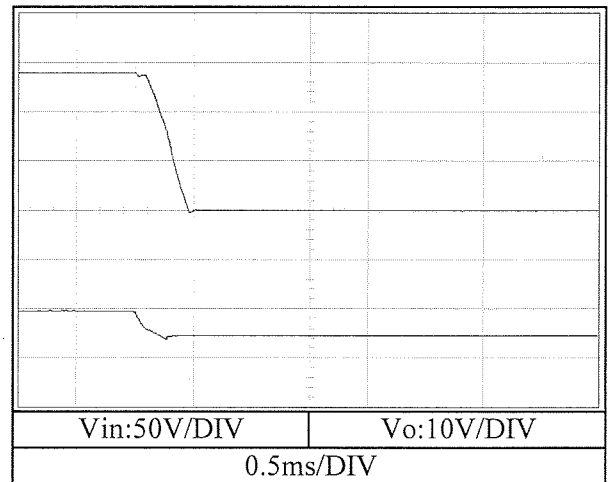
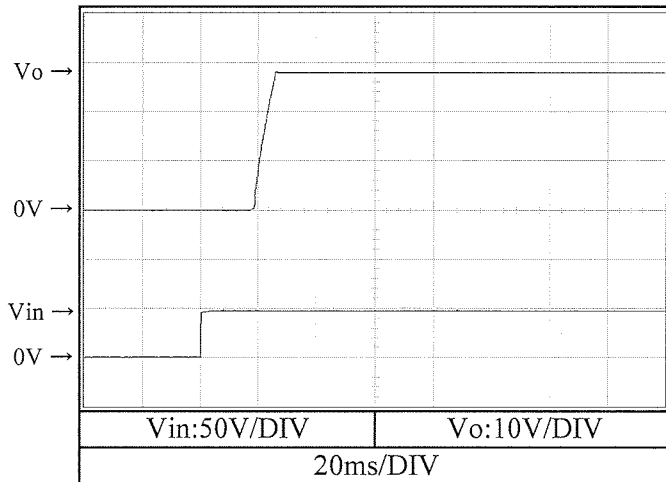
48V



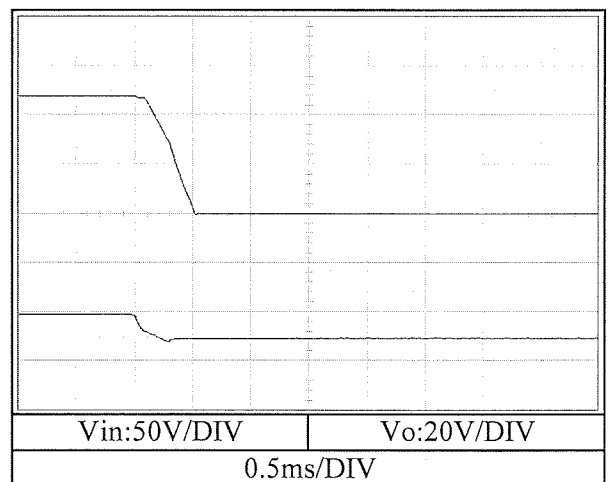
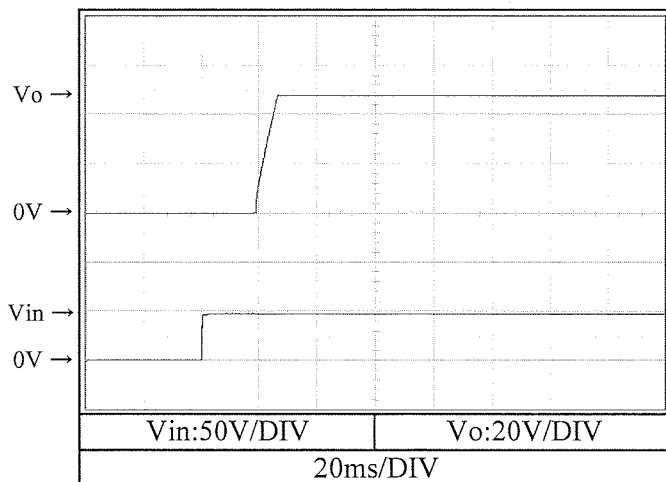
2.6 出力立ち上がり、立ち下り特性
Output rise and fall characteristics

Conditions Vin : 48 VDC
Io : 100 %
Tbp : 25 °C

28V



48V



2.6 出力立ち上がり、立ち下り特性 (ON/OFFコントロール時)

Output rise and fall characteristics with ON/OFF CONTROL

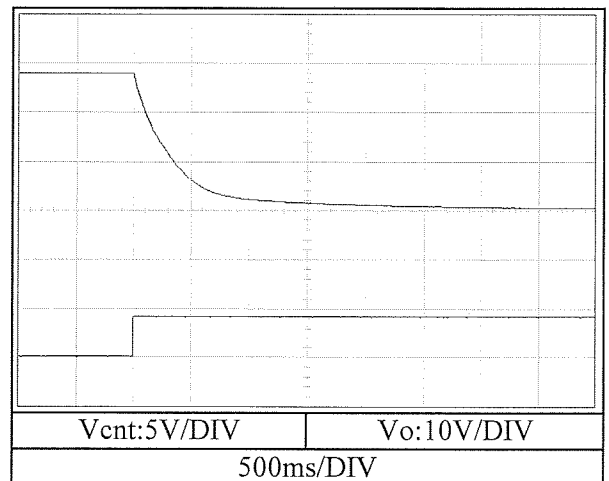
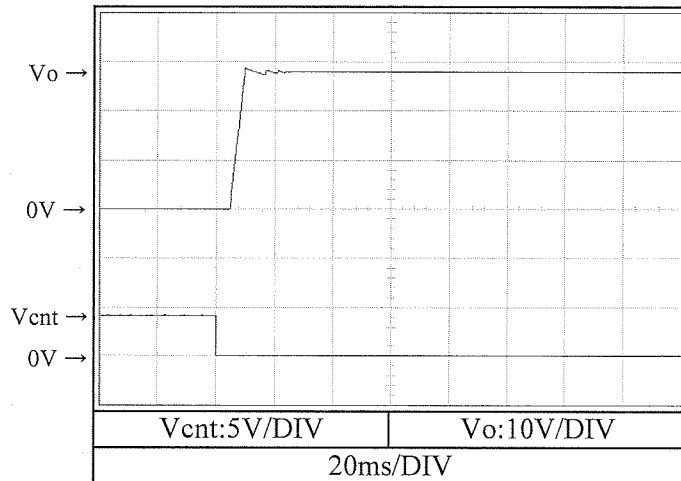
Conditions

V_{in} : 48 VDC

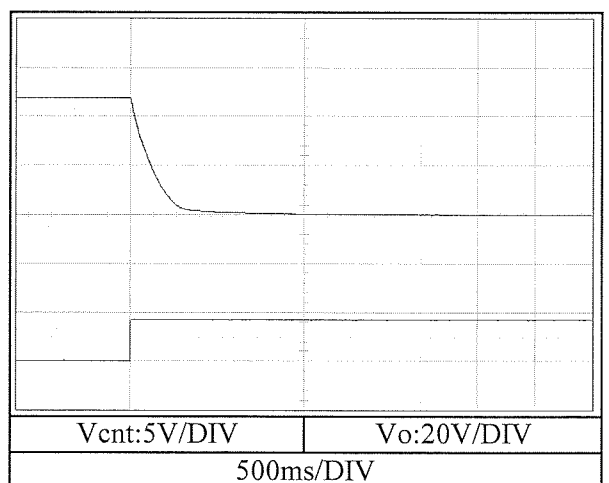
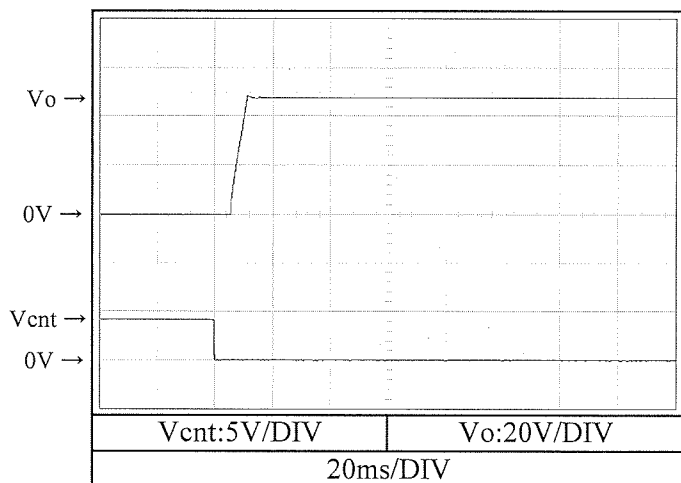
I_o : 0%

T_{bp} : 25 °C

28V



48V



2.6 出力立ち上がり、立ち下り特性 (ON/OFFコントロール時)

Output rise and fall characteristics with ON/OFF CONTROL

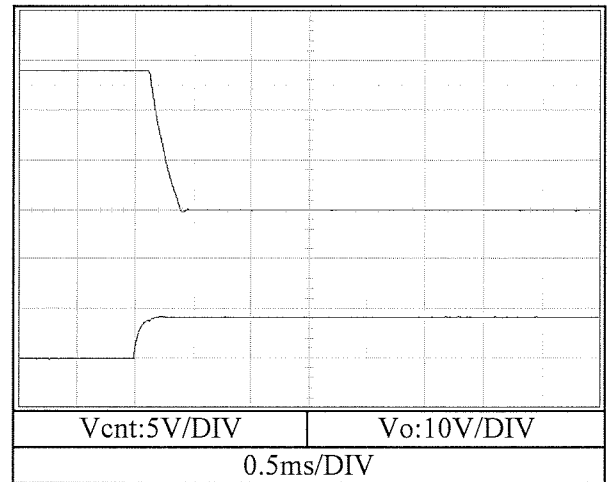
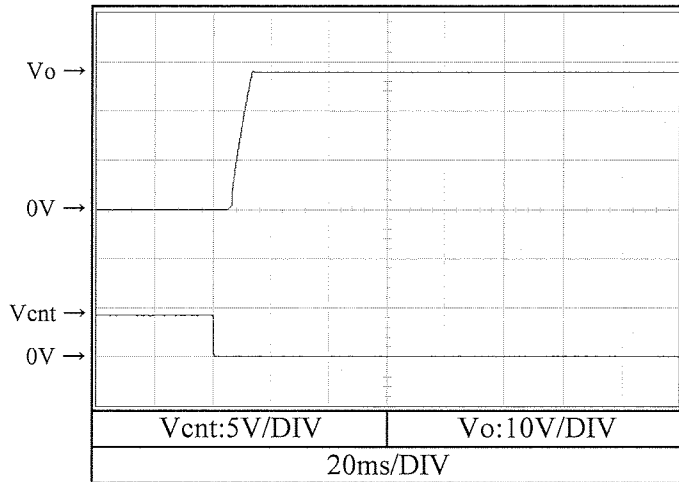
Conditions

Vin : 48 VDC

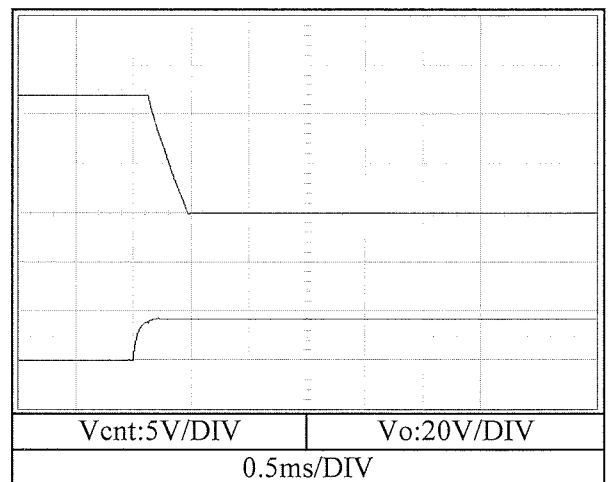
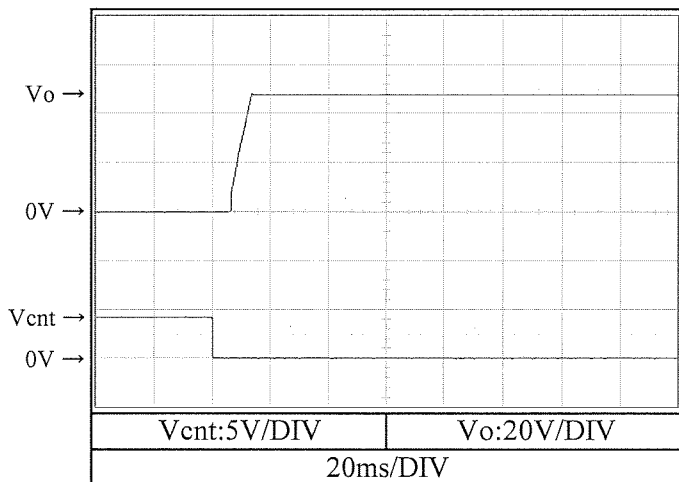
Io : 100 %

Tbp : 25 °C

28V



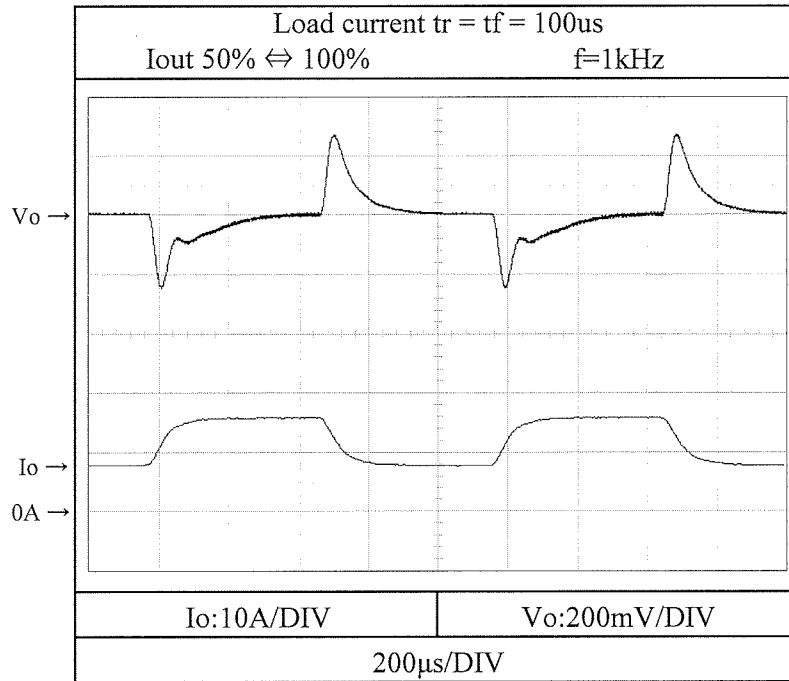
48V



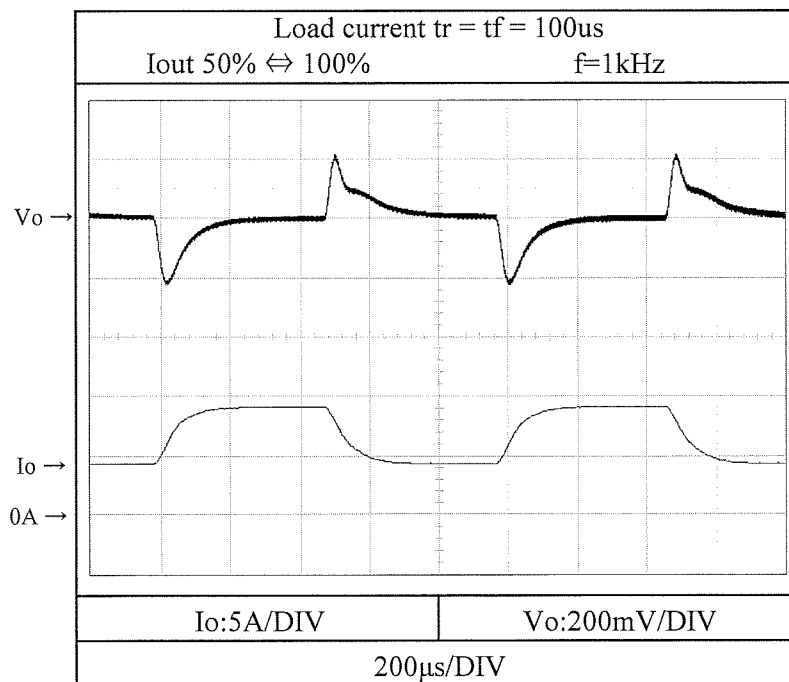
2.7 過渡応答（負荷急変）特性
Dynamic load response characteristics

Conditions Vin : 48 VDC
Tbp : 25 °C

28V



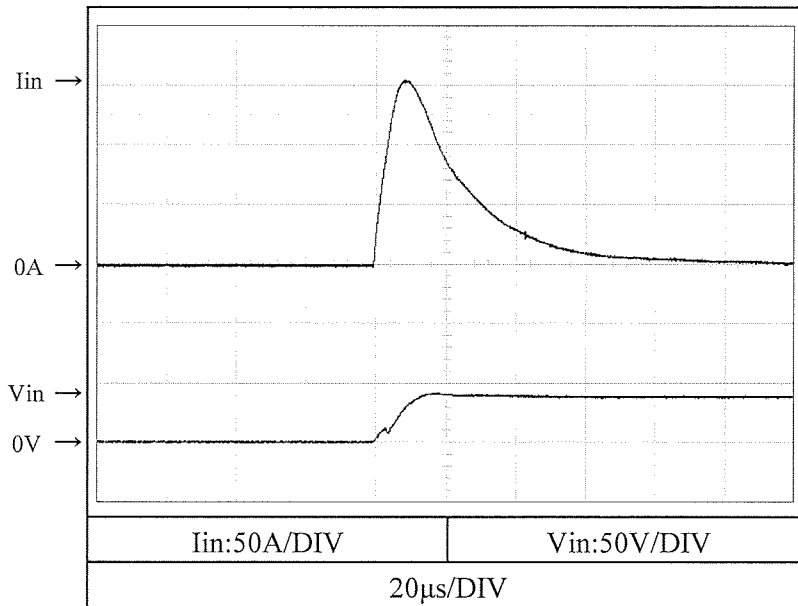
48V



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

Conditions Vin : 48 VDC
Io : 100 %
Tbp : 25 °C

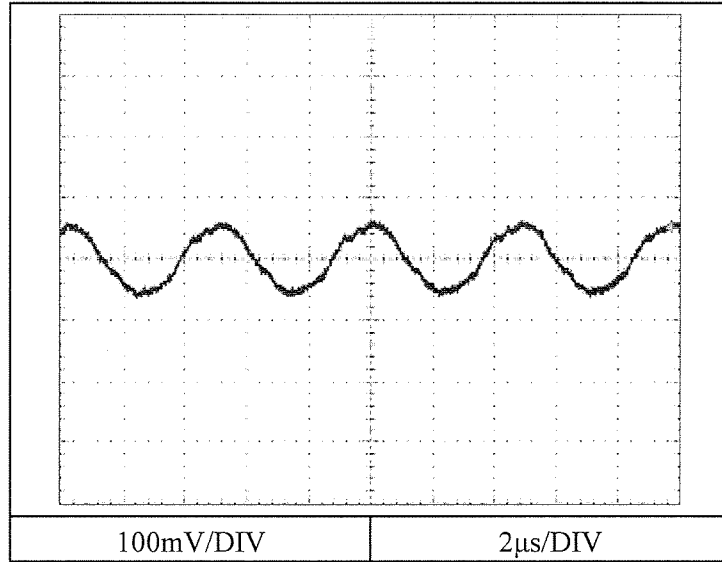
48V



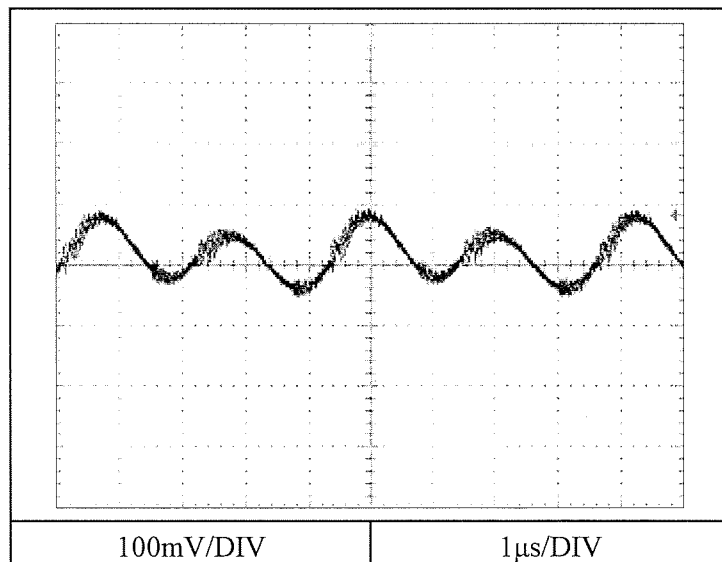
2.9 出力リップル、ノイズ波形
Output ripple and noise waveform

Conditions Vin : 48 VDC
Io : 100 %
Tbp : 25 °C

28V



48V



2.10 EMI特性

Electro-Magnetic Interference characteristics

(a) 雑音端子電圧 (帰還ノイズ)

Conducted Emission

Conditions

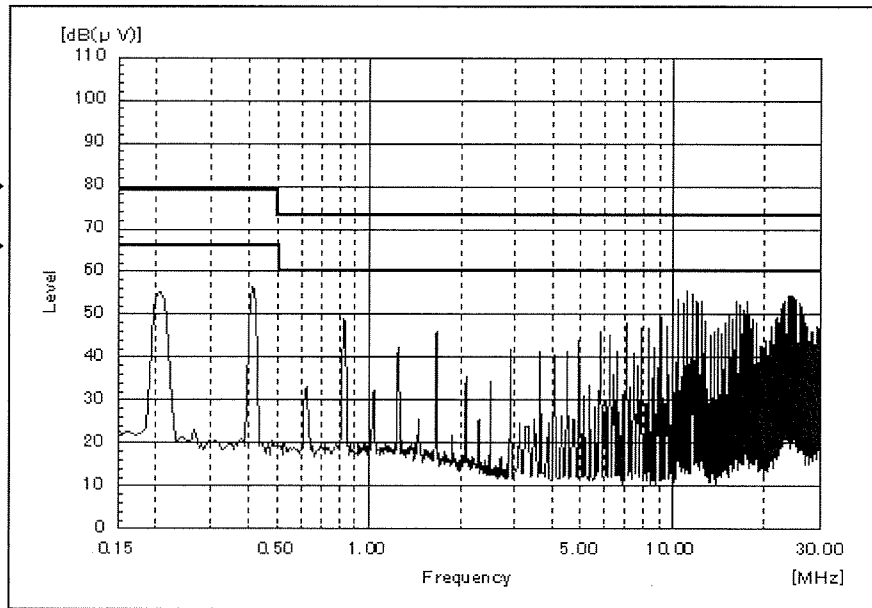
Vin : 48 VDC

Io : 100 %

Tbp : 25 °C

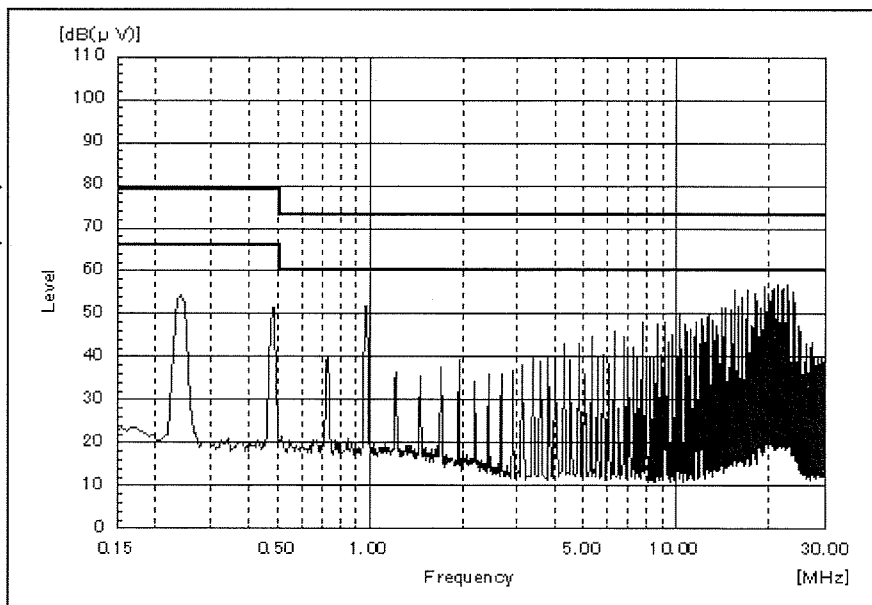
28V

VCCI classA →
QP Limit
VCCI classA →
AV Limit



48V

VCCI classA →
QP Limit
VCCI classA →
AV Limit



2.10 EMI特性

Electro-Magnetic Interference characteristics

(b) 雑音電界強度 (輻射ノイズ)

Radiated Emission

Conditions

Vin : 48 VDC

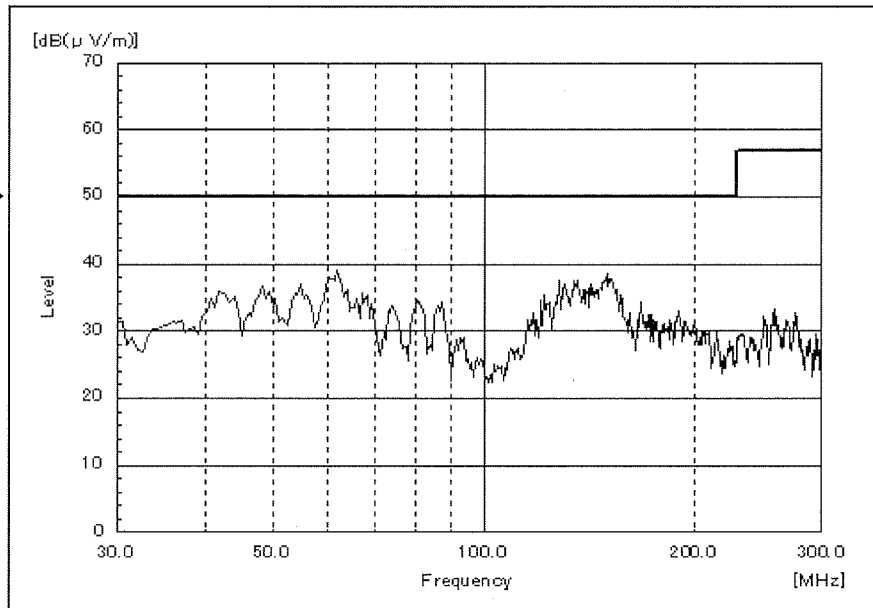
Io : 100 %

Tbp : 25 °C

28V

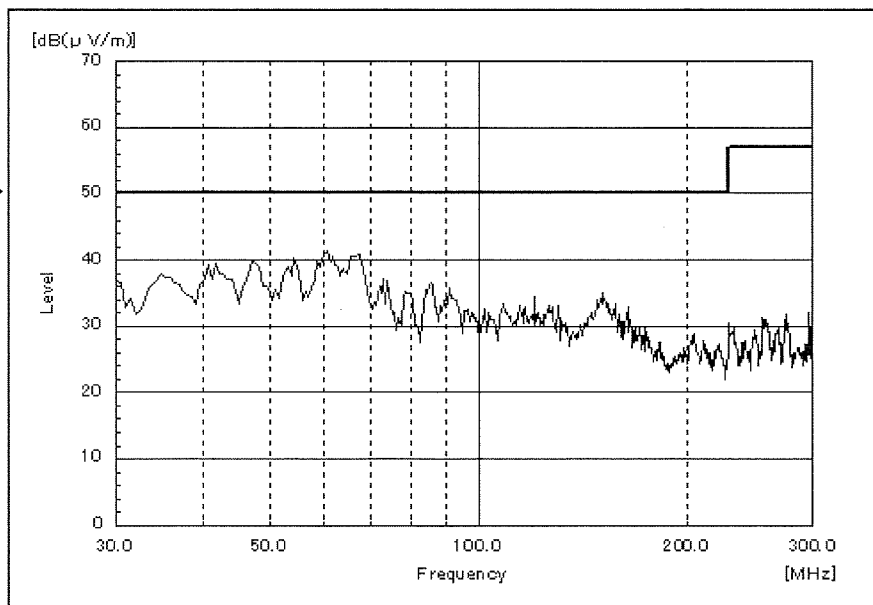
HORIZONTAL

VCCI classA →
QP Limit



VERTICAL

VCCI classA →
QP Limit



2.10 EMI特性

Electro-Magnetic Interference characteristics

(b) 雑音電界強度 (輻射ノイズ)

Radiated Emission

Conditions

Vin : 48 VDC

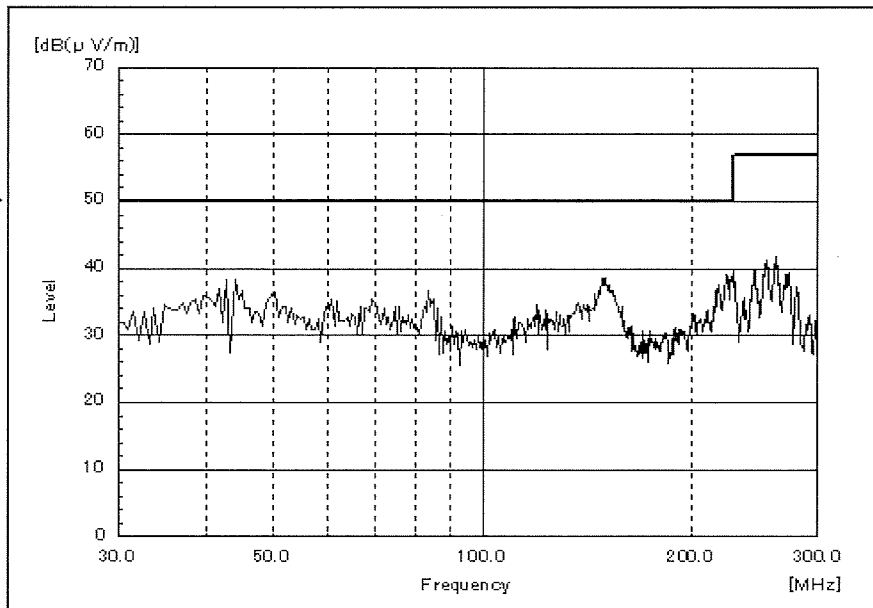
Io : 100 %

Tbp : 25 °C

48V

HORIZONTAL

VCCI classA →
QP Limit



VERTICAL

VCCI classA →
QP Limit

