

# CPF1000F280

## EVALUATION DATA

### 型式データ

## INDEX

1. 評価方法	Evaluation Method	PAGE
1.1	測定回路 Measurement Circuits .....	T-1
	(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	
	(4) EMI 特性 Electro-Magnetic Interference characteristics	
1.2	使用測定機器 List of equipment used .....	T-3
2. 特性データ	Characteristics	
2.1	静特性 Steady state data	
	(1) 入力変動、負荷変動、温度変動 Line regulation, Load regulation, Temperature drift .....	T-4
	(2) 出力電圧、出力リップル・ノイズ電圧 対 入力電圧 Output voltage and Output ripple and noise voltage vs. Input voltage .....	T-5
	(3) 入力電流、効率 対 出力電流 Input current and Efficiency vs. Output current .....	T-6
	(4) 効率 対 入力電圧 Efficiency vs. Input voltage .....	T-7
	(5) 効率 対 ベースプレート温度 Efficiency vs. Base-plate temperature .....	T-8
	(6) 起動、停止電圧特性 Start and Stop voltage characteristics .....	T-9
2.2	待機電力特性 Standby power characteristics .....	T-10
2.3	通電ドリフト特性 Warm up voltage drift characteristics .....	T-11
2.4	過電流保護特性 Over current protection (OCP) characteristics .....	T-12
2.5	過電圧保護特性 Over voltage protection (OVP) characteristics .....	T-13
2.6	出力立ち上がり、立ち下がり特性 Output rise and fall characteristics .....	T-14
2.7	過渡応答（負荷急変）特性 Dynamic load response characteristics .....	T-16
2.8	入力サージ電流（突入電流）特性 Inrush current characteristics .....	T-17
2.9	出力リップル・ノイズ波形 Output ripple and noise waveform .....	T-18
2.10	EMI特性 Electro-Magnetic Interference characteristics .....	T-19

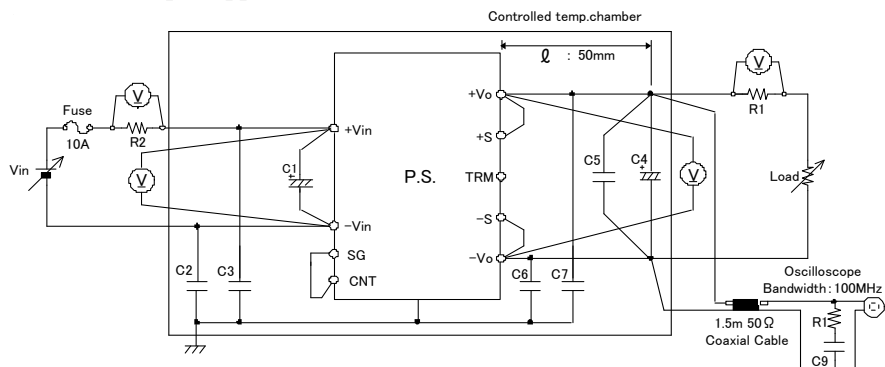
## 使用記号 Terminology used

Definition		
V <sub>in</sub> .....	入力電圧	Input voltage
V <sub>o</sub> .....	出力電圧	Output voltage
V <sub>cnt</sub> .....	CNT電圧	CNT voltage
I <sub>in</sub> .....	入力電流	Input current
I <sub>o</sub> .....	出力電流	Output current
T <sub>bp</sub> .....	ベースプレート温度	Base-plate temperature
T <sub>a</sub> .....	周囲温度	Ambient temperature
f .....	周波数	Frequency

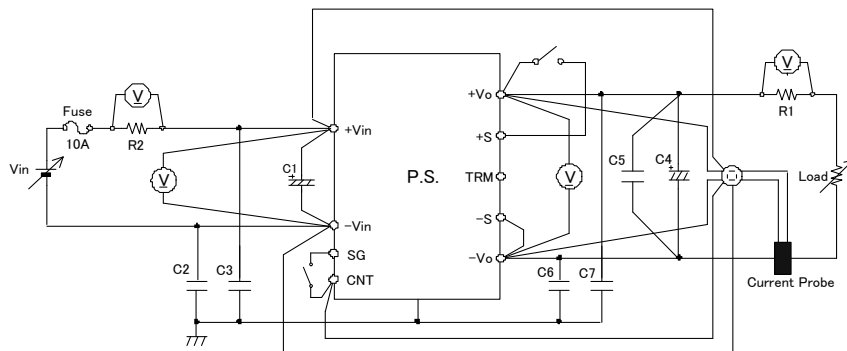
1. 評価方法 Evaluation Method

1.1 測定回路 Measurement Circuits

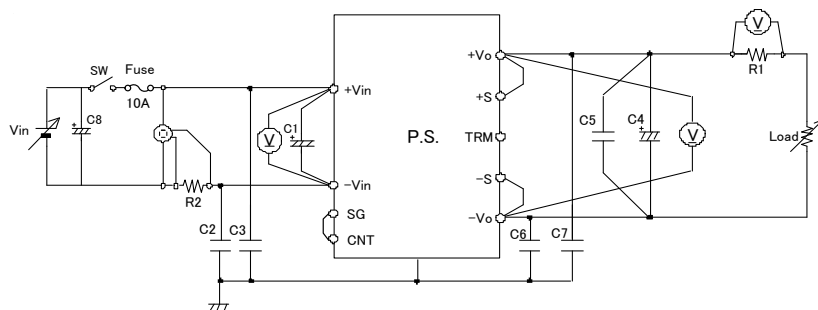
- (1) 静特性、過電流保護特性、出力リップル・ノイズ波形  
 Steady state characteristics, Over current protection (OCP) characteristics,  
 and Output ripple and noise waveform



- (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



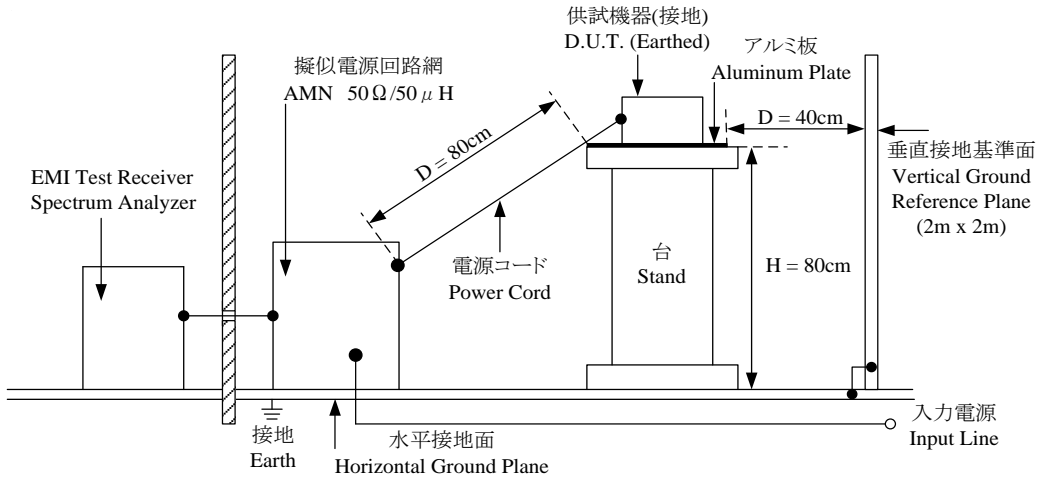
- (3) 入力サージ電流（突入電流）特性  
 Inrush current characteristics



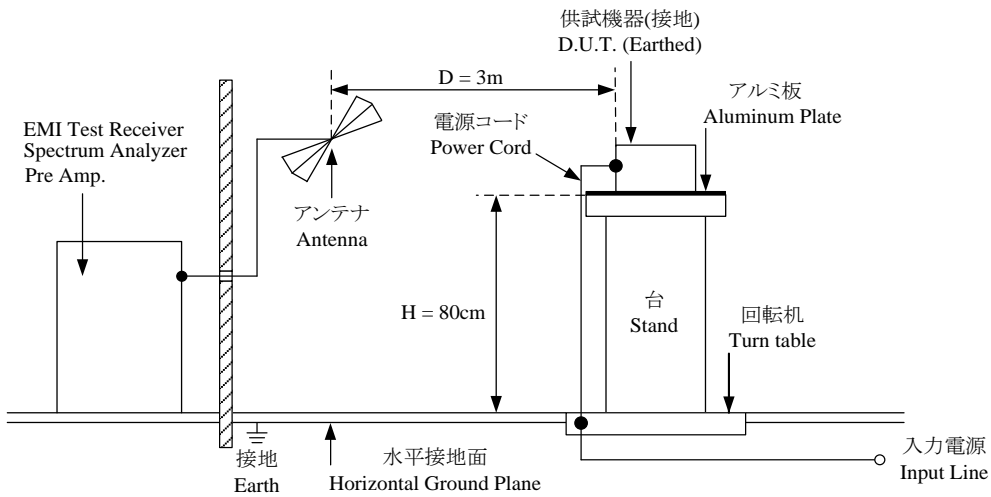
- |  |                                    |
|--|------------------------------------|
| C1 : 22uF Electrolytic Capacitor             | C6,C7 : 0.022uF Ceramic Capacitor  |
| C2,C3 : 2200pF Ceramic Capacitor             | C8 : 8000uF Electrolytic Capacitor |
| C4 : 1500uF×2parallel Electrolytic Capacitor | R1 : 0.0005 Ω                      |
| C5 : 2.2μF Ceramic Capacitor                 | R2 : 0.005 Ω                       |

(4) EMI特性 Electro-Magnetic Interference characteristics

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

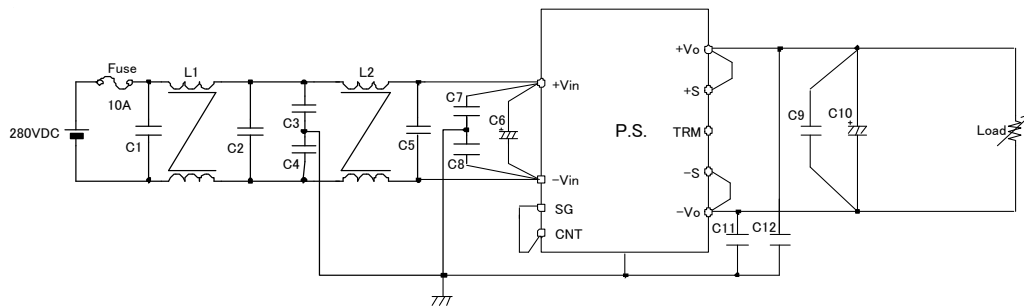


(b) 雑音電界強度 (輻射ノイズ) Radiated Emission Noise



\*入出力ケーブルとしてシールドケーブルを使用  
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,C2,C5 : 0.68μF Film Capacitor  
C3,C4,C7,C8 : 1500pF Ceramic Capacitor  
C6 : 22μF Electrolytic Capacitor  
C9 : 2.2μF Ceramic Capacitor

C10 : 1500uF×2parallel Electrolytic Capacitor  
C11,C12 : 0.022uF Ceramic Capacitor  
L1 : 5.0mH  
L2 : 3.8mH

## 1.2 使用測定機器 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	AC POWER SUPPLY	KIKUSUI	PCR2000L
2	DYNAMIC DUMMY LOAD	Chroma	63201
3	DUMMY LOAD	ARCOL	HS50 SERIES
4	DATA ACQUISITION / SWITCH UNIT	AGILENT	34970A
5	SHUNT RESISTER	YOKOGAWA ELECT.	2215
6	CONTROLLED TEMP. CHAMBER	ESPEC CORP.	SH-661
7	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA	DLM2054
8	CURRENT PROBE	YOKOGAWA	701930
9	EMI TEST RECEIVER SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESCI
10	PRE AMP.	SONOMA	310N
11	AMN	SCHWARZBECK	NNLK8121
12	ANTENNA(BI-LOG ANTENNA)	TESEQ	CBL6111D

## 2. 特性データ Characteristics

### 2.1 静特性 Steady state data

(1) 入力変動、負荷変動、温度変動 Line regulation, Load regulation, Temperature drift

14V
-----

#### 1. Line regulation and Load regulation

Condition Tbp : 25°C

Io \ Vin	245VDC	280VDC	300VDC	400VDC	Line regulation	
0%	13.986V	13.985V	13.986V	13.985V	0mV	0.002%
50%	13.986V	13.985V	13.986V	13.986V	0mV	0.002%
100%	13.986V	13.985V	13.986V	13.986V	0mV	0.002%
Load regulation	0mV	0mV	0mV	0mV		
	0.001%	0.002%	0.000%	0.002%		

#### 2. Temperature drift

Conditions Vin : 280VDC

Io : 100%

Tbp	-40°C	+25°C	+100°C	Temperature stability	
Vo	13.968V	13.985V	13.924V	61mV	0.438%

11V
-----

#### 1. Line regulation and Load regulation

Condition Tbp : 25°C

Io \ Vin	200VDC	245VDC	280VDC	400VDC	Line regulation	
0%	10.995V	10.995V	10.995V	10.995V	0mV	0.004%
50%	10.995V	10.995V	10.995V	10.995V	1mV	0.006%
100%	10.994V	10.995V	10.995V	10.995V	1mV	0.006%
Load regulation	1mV	1mV	1mV	1mV		
	0.005%	0.006%	0.004%	0.004%		

#### 2. Temperature drift

Conditions Vin : 280VDC

Io : 100%

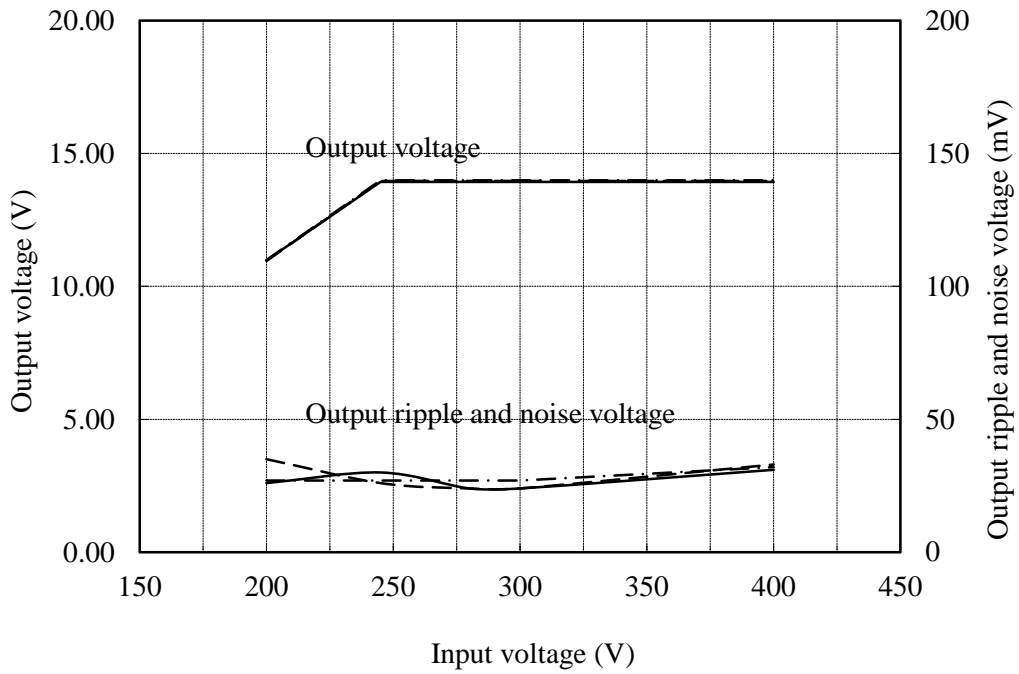
Tbp	-40°C	+25°C	+100°C	Temperature stability	
Vo	10.954V	10.995V	10.982V	40mV	0.289%

(2) 出力電圧、出力リップル・ノイズ電圧 対 入力電圧

Output voltage and Output ripple and noise voltage vs. Input voltage

Conditions Io : 100 %  
 Tbp : -40 °C -----  
 : 25 °C -.-.-.-  
 : 100 °C \_\_\_\_\_

14V

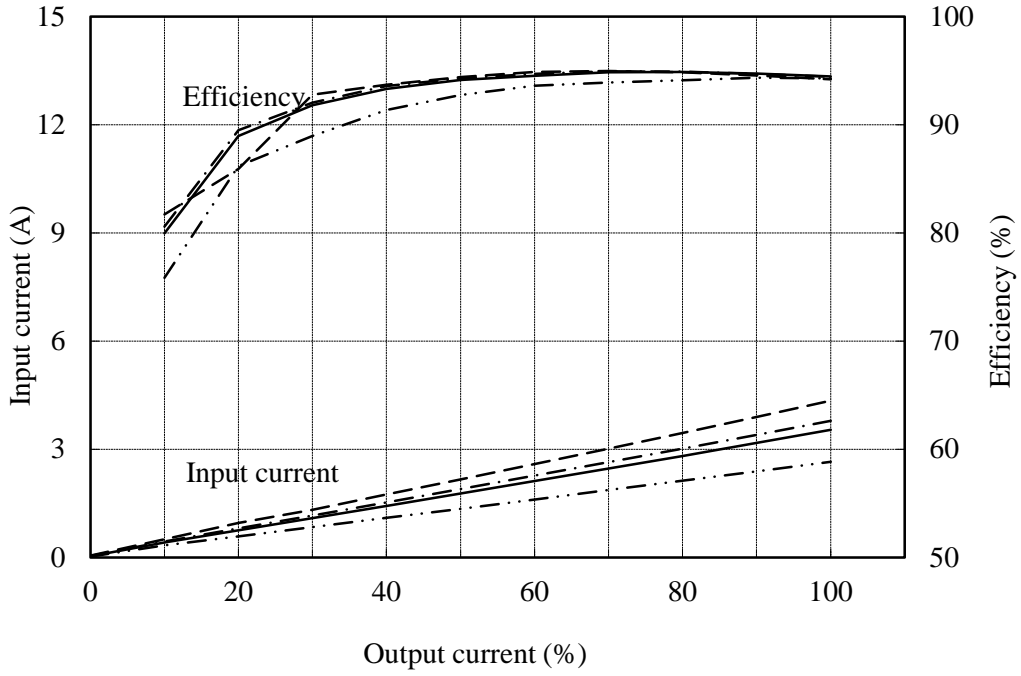


(3) 入力電流、効率 対 出力電流

Input current and Efficiency vs. Output current

Conditions Vin : 245 VDC -----  
 : 280 VDC -.-.-.-  
 : 300 VDC ————  
 : 400 VDC -·-·-·-  
 Tbp : 25 °C

14V



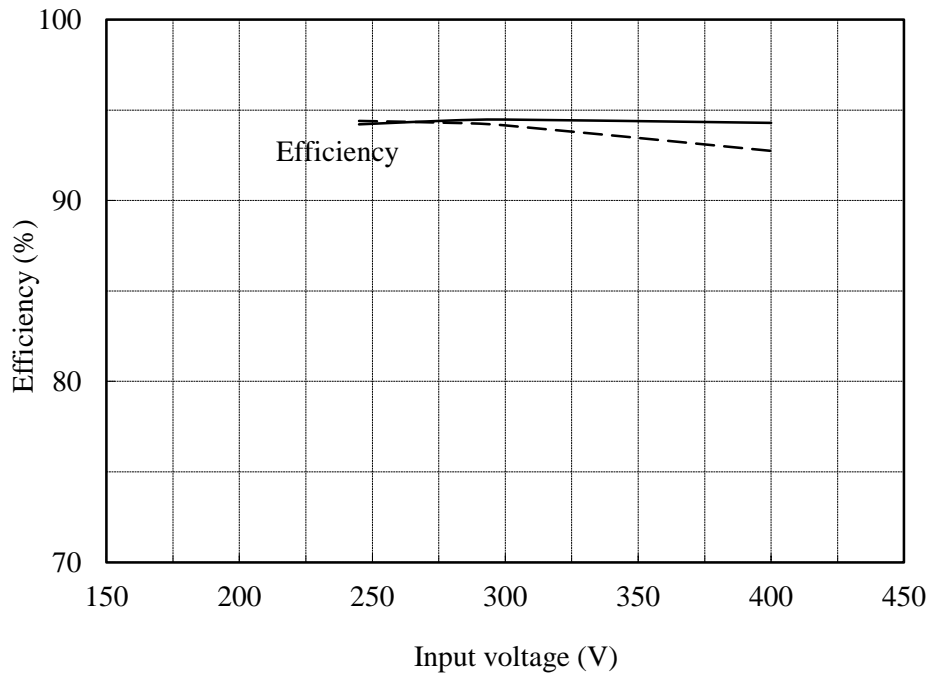


(4) 効率 対 入力電圧

Efficiency vs. Input voltage

Conditions Io : 50 % -----  
 : 100 % \_\_\_\_\_  
 Tbp : 25 °C

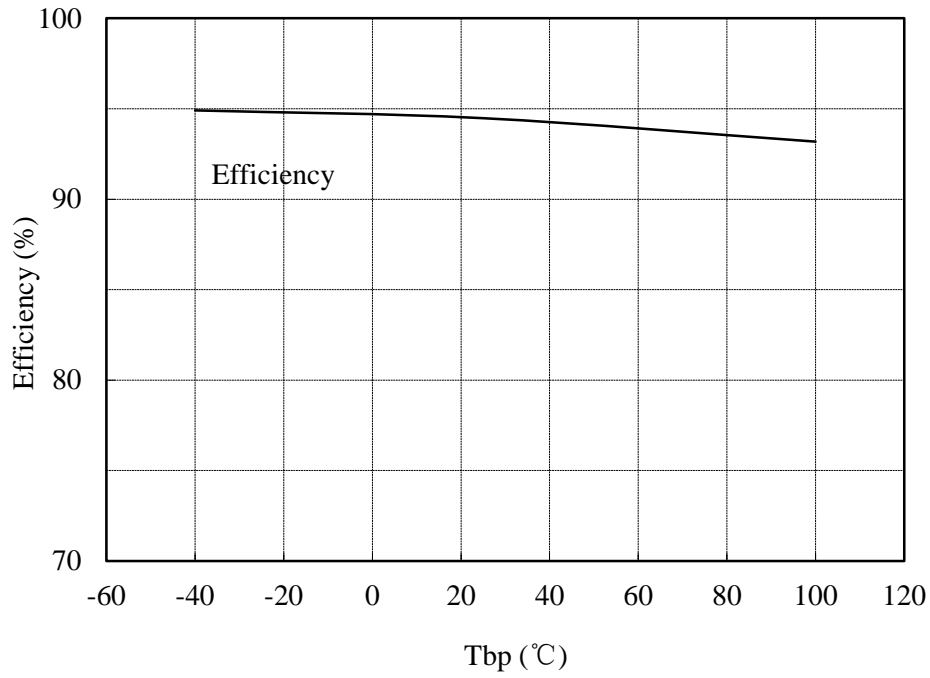
14V



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

Conditions Vin : 280 VDC  
 Io : 100 %

14V

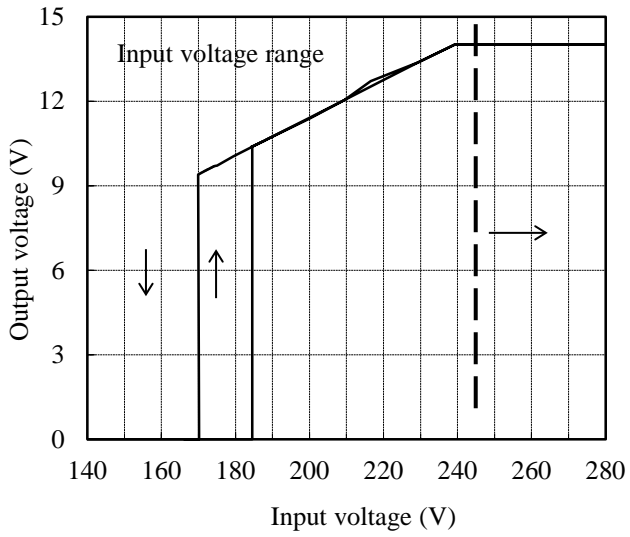


(6) 起動、停止電圧特性  
Start and Stop voltage characteristics

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

Conditions  $I_o$  : 100 %  
 $T_{bp}$  : 25 °C

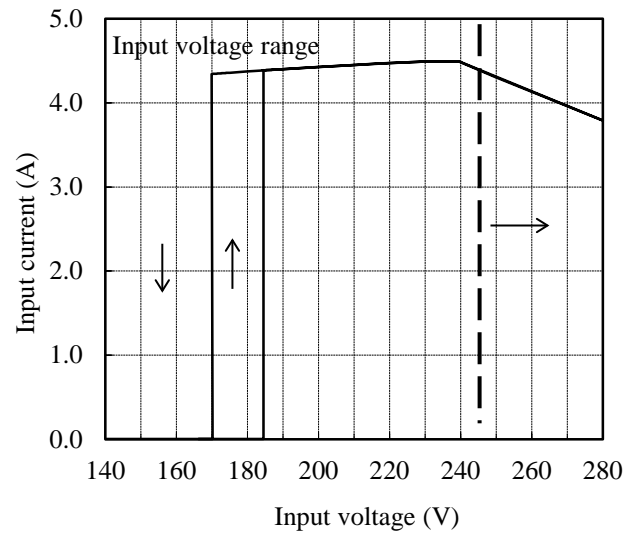
14V



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

Conditions  $I_o$  : 100 %  
 $T_{bp}$  : 25 °C

14V

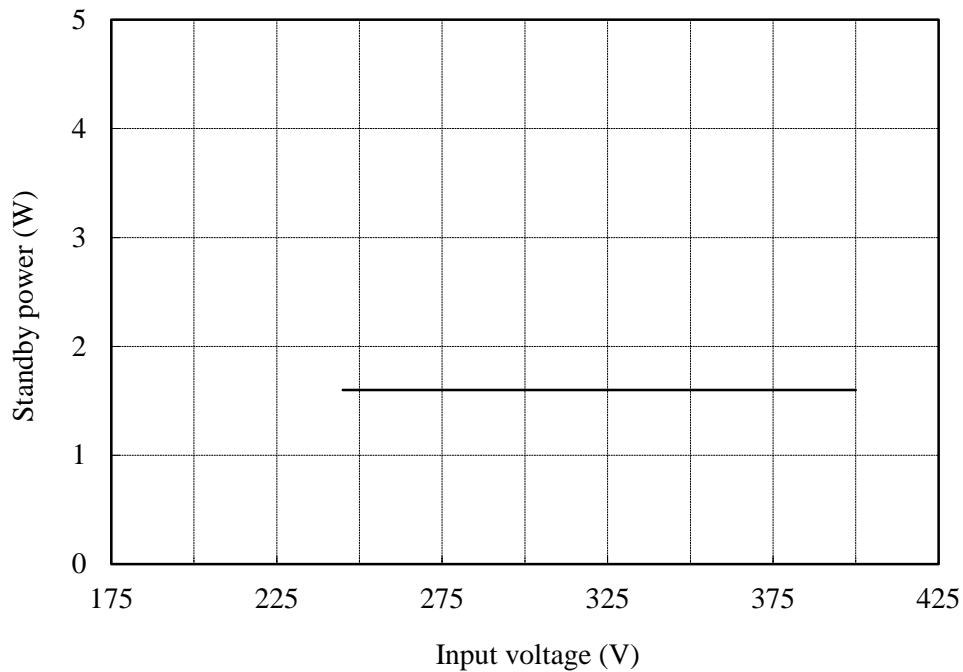


2.2 待機電力特性

Standby power characteristics

Conditions Tbp : 25 °C

14V



2.3 通電ドリフト特性

Warm up voltage drift characteristics

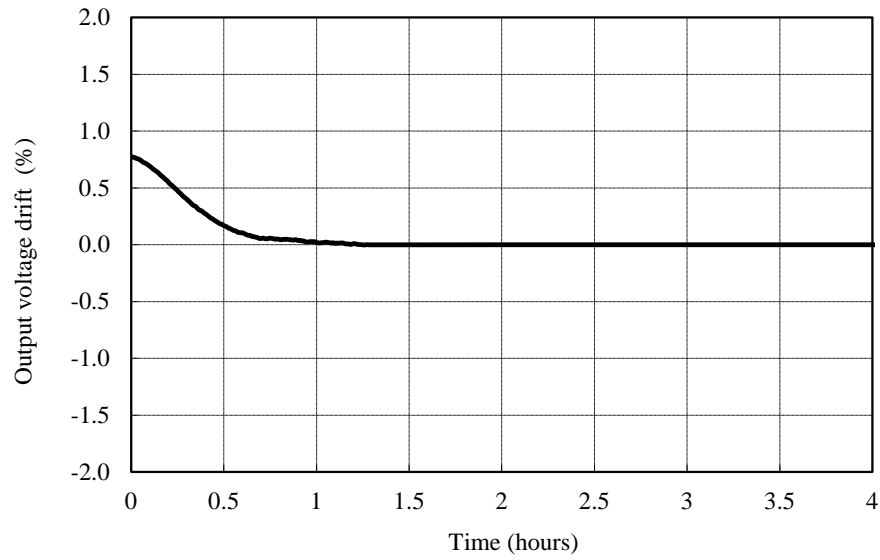
Conditions

Vin : 280 VDC

Io : 100 %

Ta : 25 °C

14V



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 : 245 VDC -----  
 : 280 VDC -.-.-.-  
 : 400 VDC \_\_\_\_\_

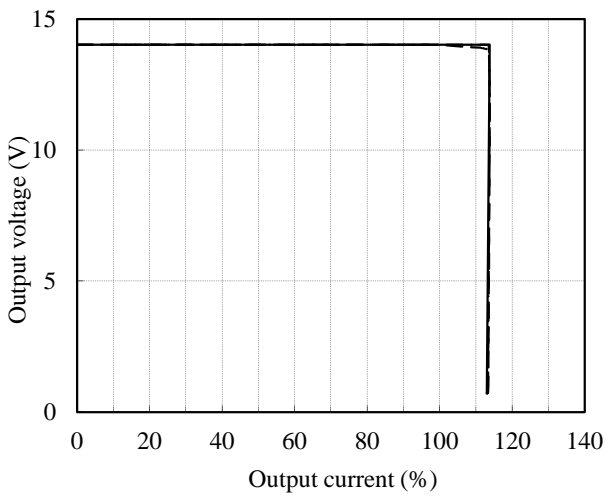
Tbp : 25 °C

ベースプレート温度依存性

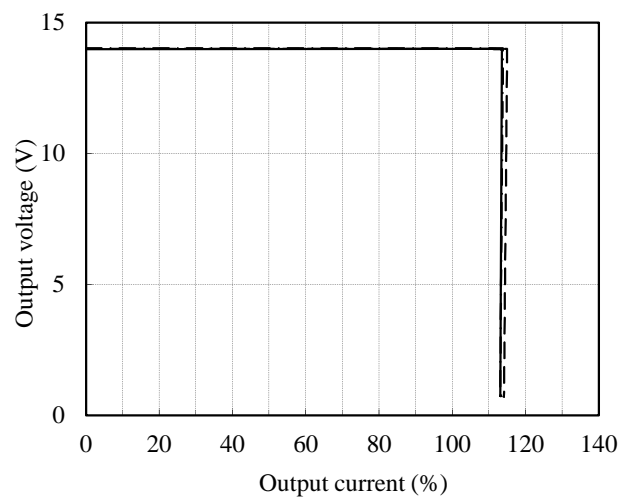
Base-plate temperature dependence

Conditions Vin : 280 VDC  
 Tbp : -40 °C -----  
 : 25 °C -.-.-.-  
 : 100 °C \_\_\_\_\_

14V



14V

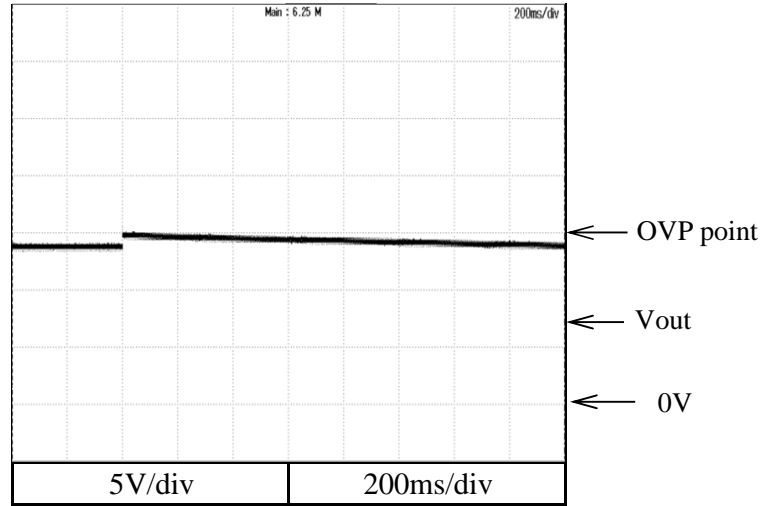


2.5 過電圧保護特性

Over voltage protection (OVP) characteristics

Conditions:  $V_{in}$  : 280VDC  
 $I_{out}$  : 0%  
 $T_{bp}$  : 25°C

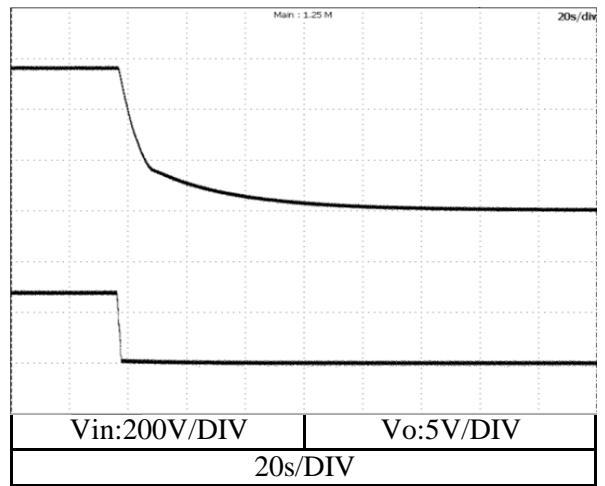
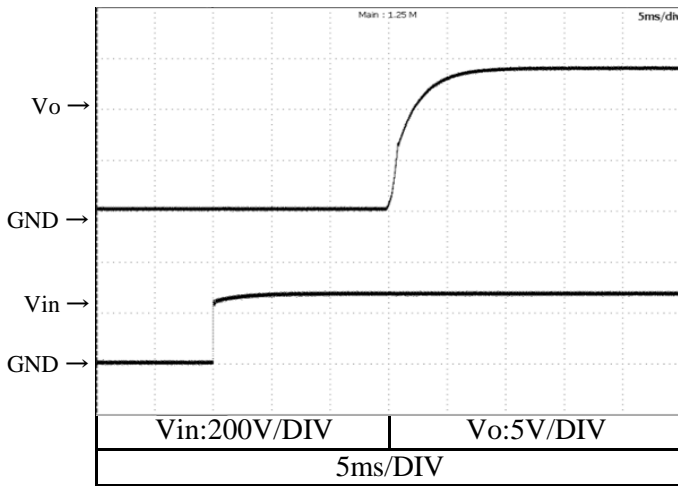
14V



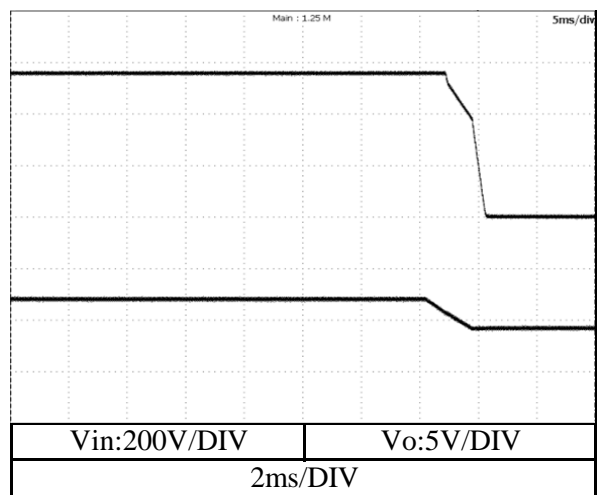
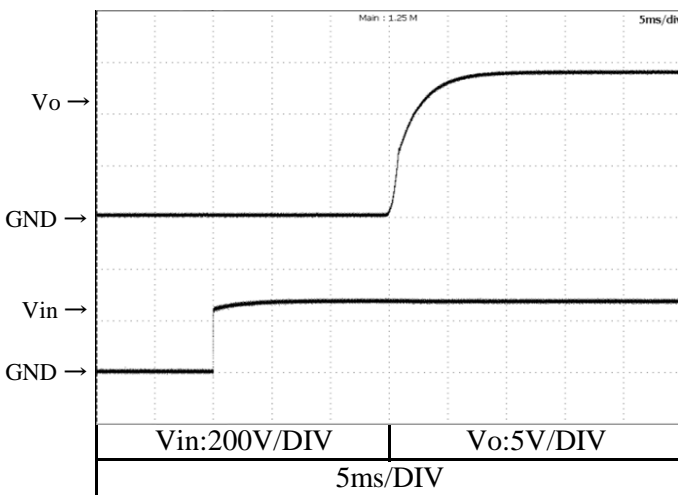
2.6 出力立ち上がり、立ち下がり特性  
Output rise and fall characteristics

Conditions       $V_{in} : 280 \text{ VDC}$   
                       $V_o : 14 \text{ V}$   
                       $T_{bp} : 25 \text{ }^\circ\text{C}$

**$I_o:0\%$**



**$I_o:100\%$**

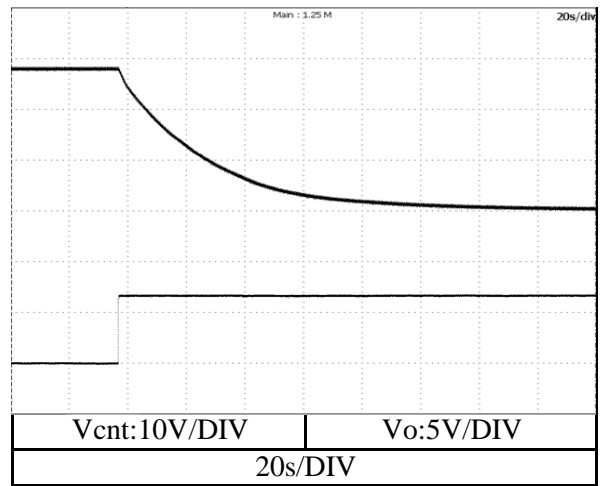
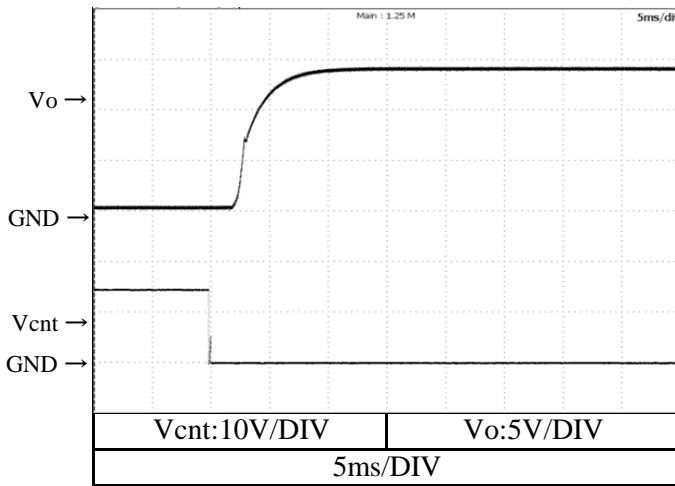




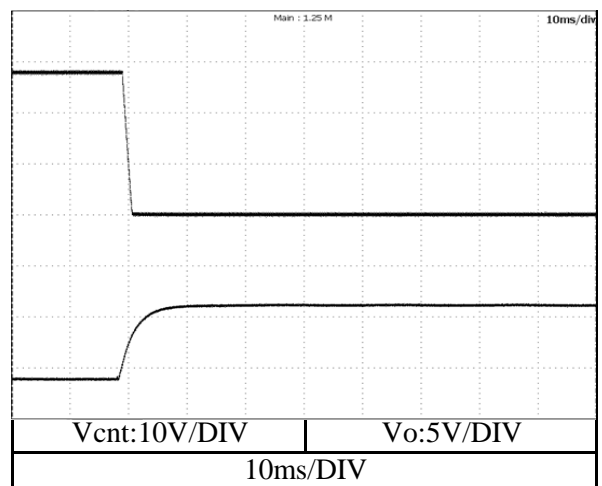
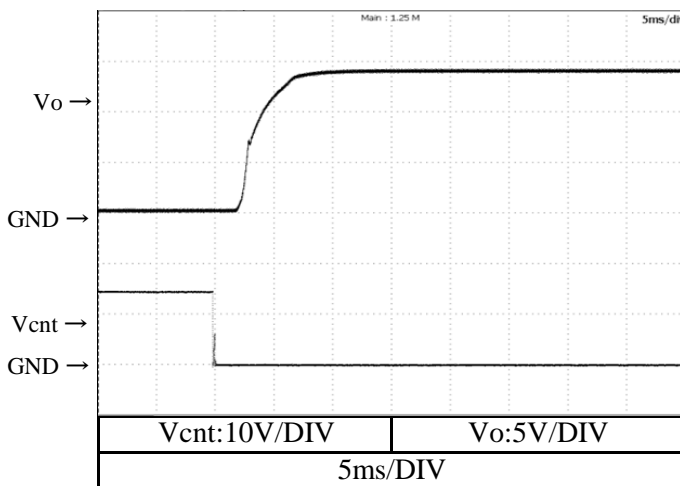
2.6 出力立ち上がり、立ち下がり特性 (ON/OFFコントロール時)  
Output rise and fall characteristics with ON/OFF CONTROL

Conditions       $V_{in}$  : 280 VDC  
 $V_o$  : 14V  
 $T_{bp}$  : 25 °C

**$I_o$ :0%**



**$I_o$ :100%**



2.7 過渡応答（負荷急変）特性

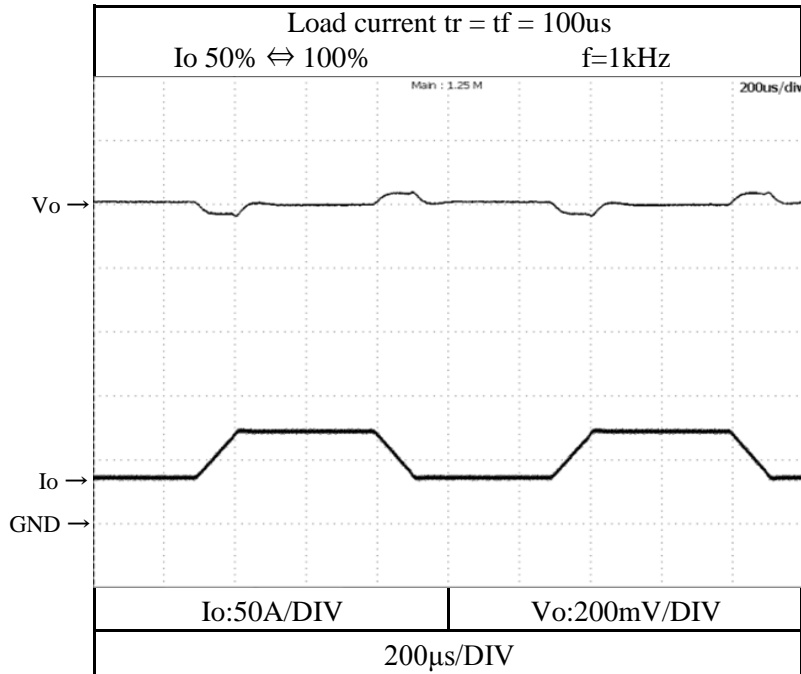
Dynamic load response characteristics

Conditions

Vin : 280 VDC

Tbp : 25 °C

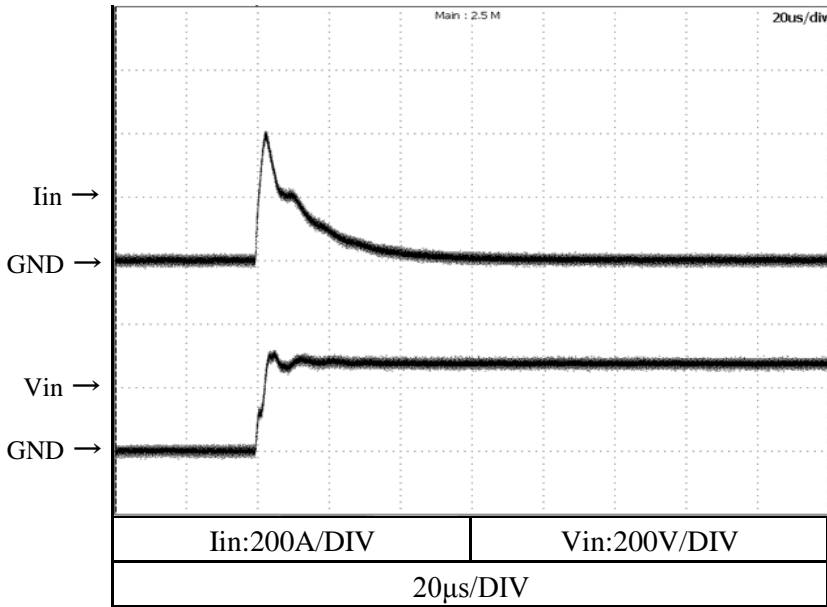
14V



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

Conditions Vin : 280 VDC  
Io : 100 %  
Tbp : 25 °C

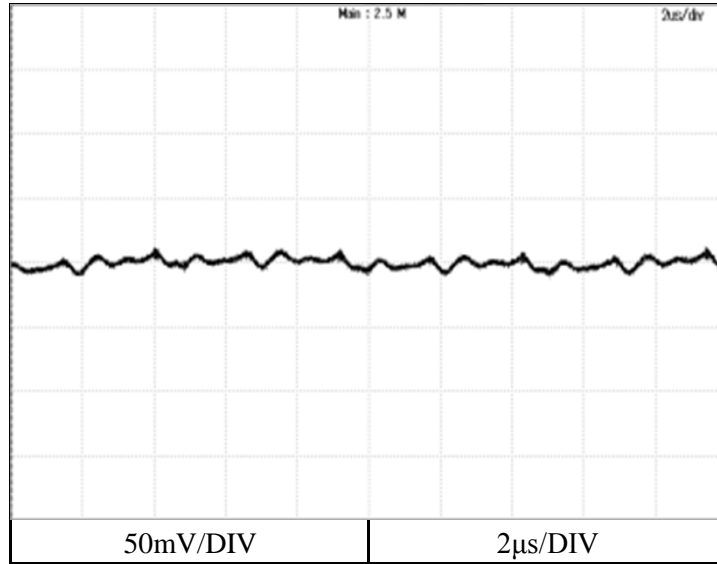
14V



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

Conditions       $V_{in}$  : 280 VDC  
                       $I_o$  : 100 %  
                       $T_{bp}$  : 25 °C

14V



2.10 EMI特性

Electro-Magnetic Interference characteristics

(a) 雑音端子電圧 (帰還ノイズ)

Conducted Emission Noise

Conditions

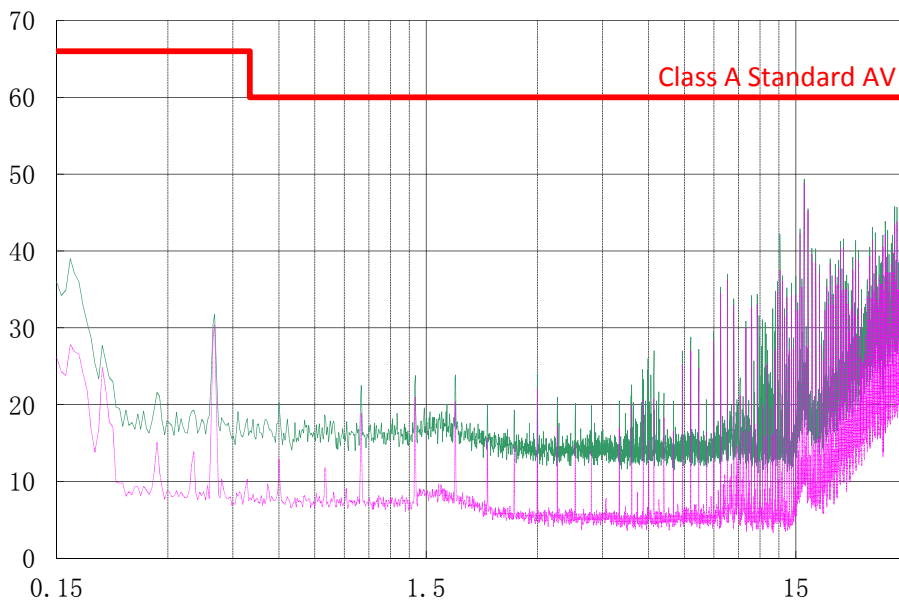
Vin : 280 VDC

Io : 100 %

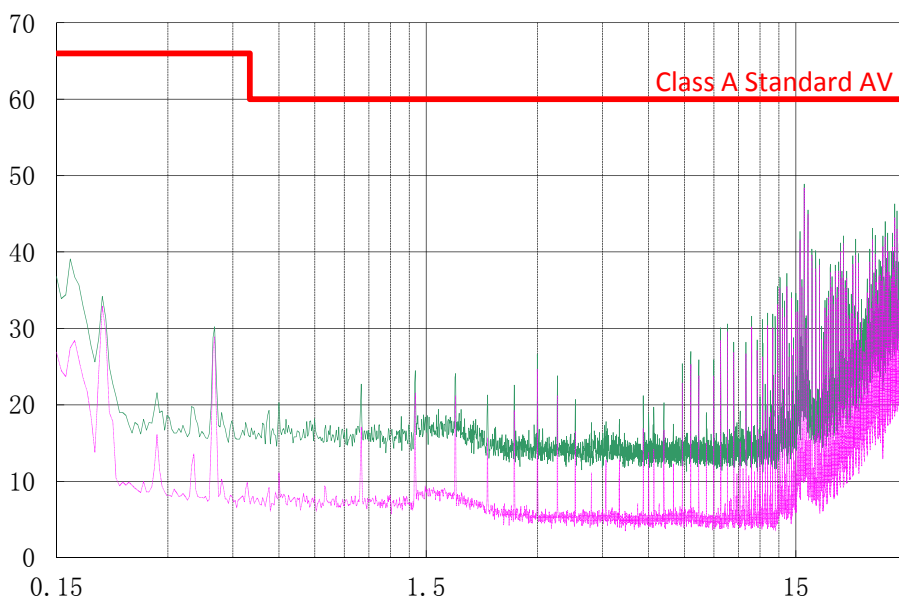
Tbp : 25 °C

14V

+Vin



-Vin



EN55011-A, EN55022-A, FCC Part.15 Subpart.B ClassAの限界値は、VCCI ClassAの限界値と同じ  
 Limit of EN55011-A, EN55022-A and FCC Part.15 Subpart.B ClassA are same as its VCCI ClassA.

2.10 EMI特性

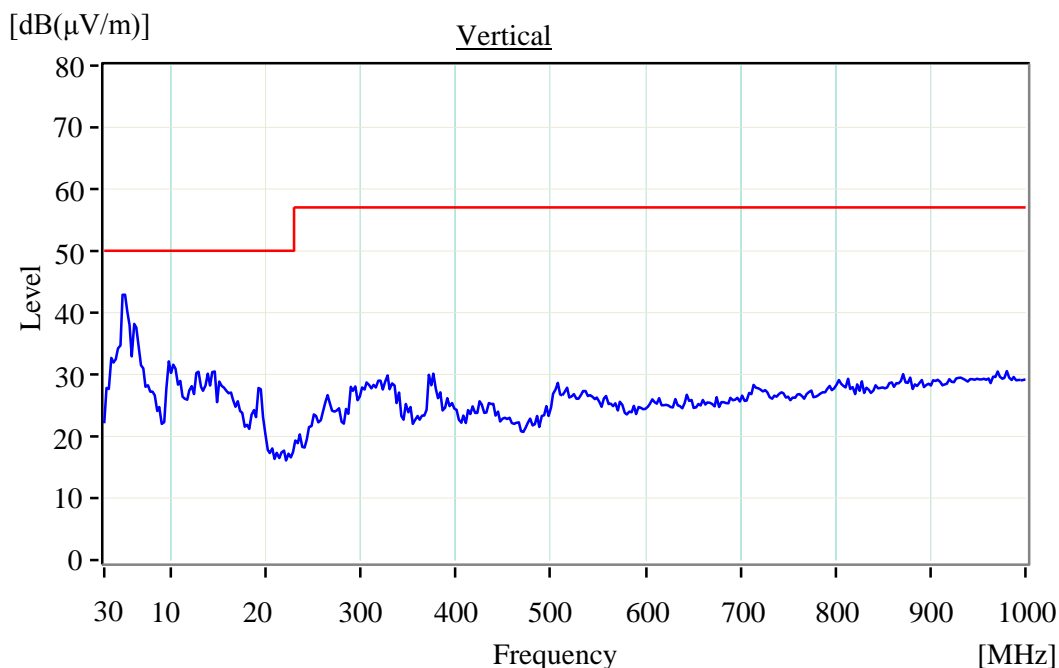
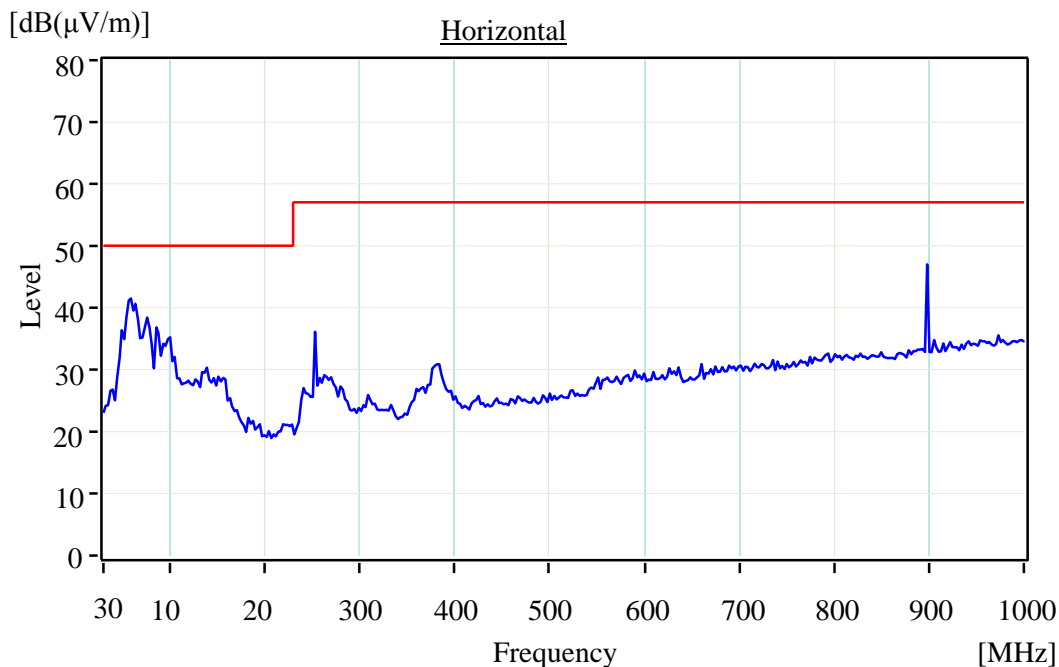
Electro-Magnetic Interference characteristics

(b) 雑音電界強度 (輻射ノイズ)

Radiated Emission Noise

Conditions Vin : 280 VDC  
Io : 100 %  
Tbp : 25 °C

14V



EN55011-A, EN55022-Aの限界値は、VCCI ClassAの限界値と同じ  
Limit of EN55011-A, EN55022-A are same as its VCCI ClassA.