CCGS15-24-xxS

EVALUATION DATA

型式データ

INDEX

使用記号 Terminology used

		定義 Definition	
Vin	・・・・・	入力電圧	Input voltage
Vo	・・・・・	出力電圧	Output voltage
V_{RC}	・・・・・	RC電圧	RC 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

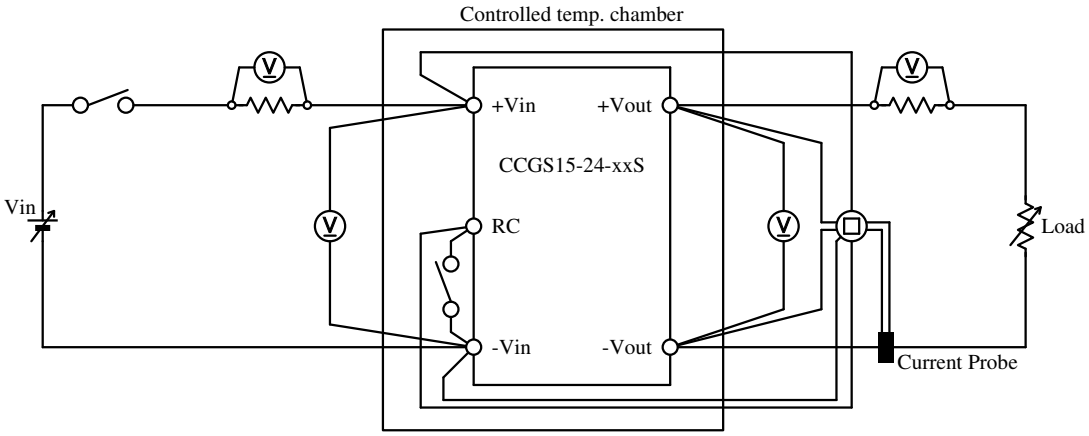
※ 当社測定条件における結果であり、参考値としてお考え願います。
Test results are reference data based on our measurement condition.

1. 測定方法 Evaluation Method

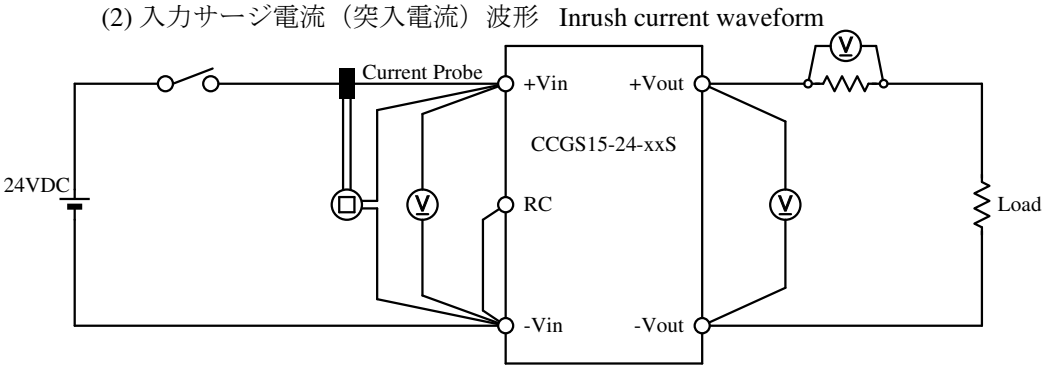
1-1. 測定回路 Measurement Circuits

(1) 静特性 、待機電力特性、通電ドリフト特性、その他特性

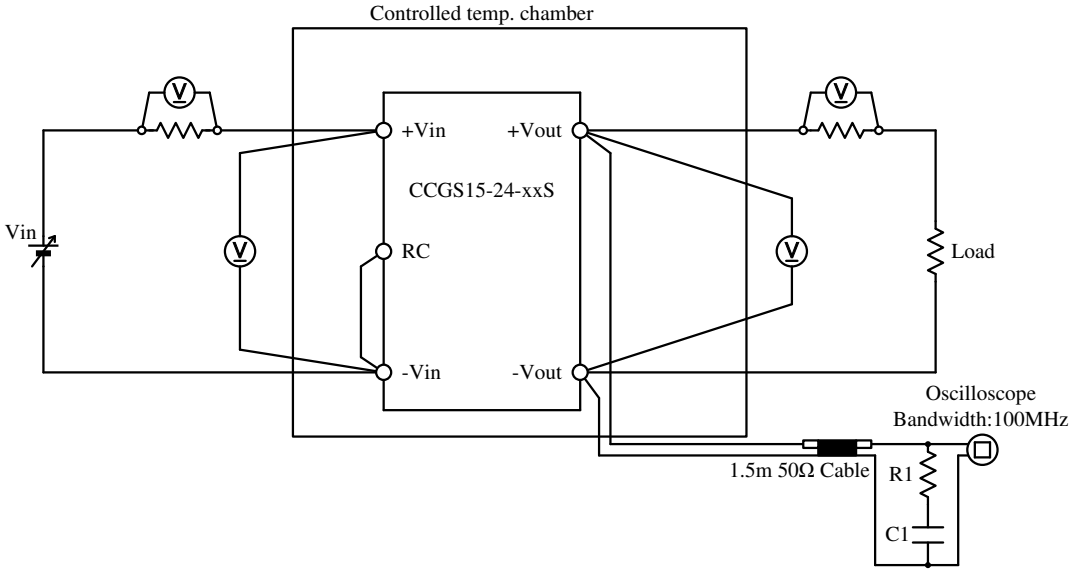
Steady state, Standby power, Warm up voltage drift and Other characteristics



(2) 入力サージ電流（突入電流）波形 Inrush current waveform



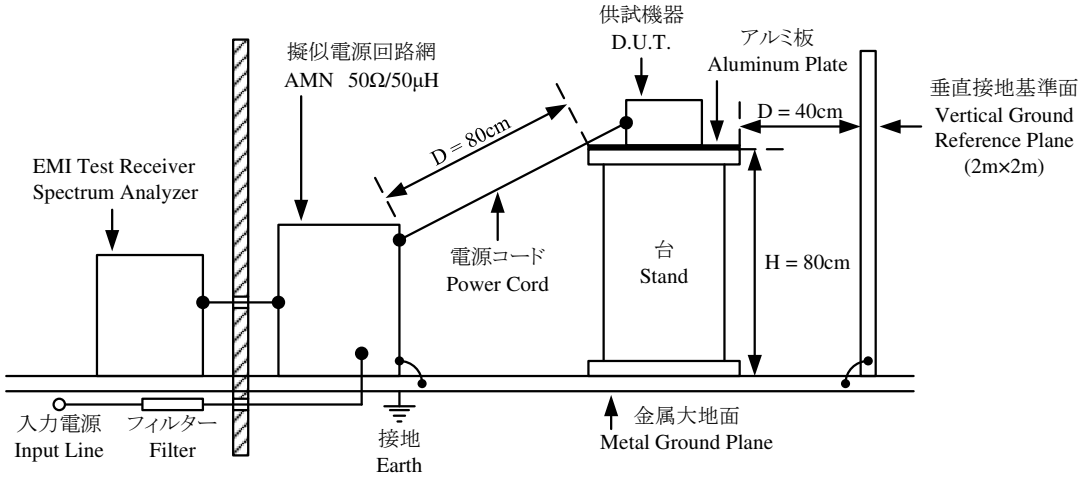
(3) 出力リップルノイズ電圧、波形 Output ripple and noise voltage and waveform



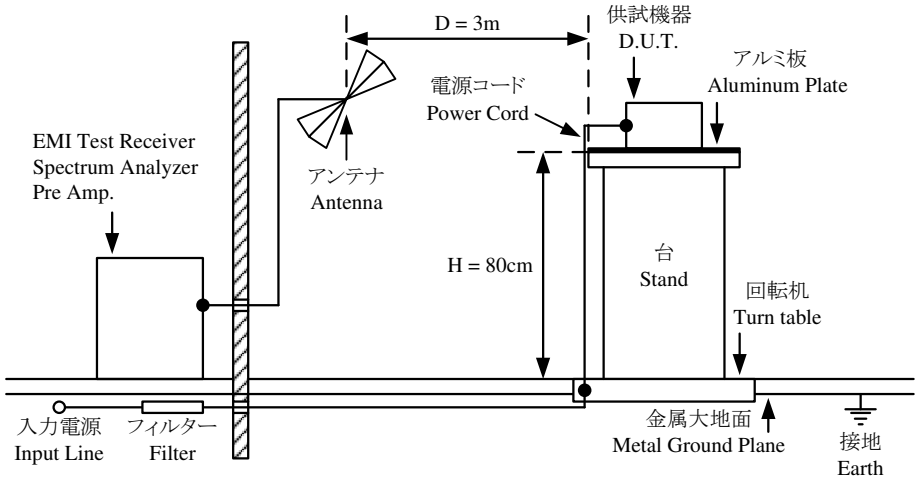
C1 ： 4700pF Ceramic Capacitor
R1 ： 50Ω

(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



1-2. 使用測定機器 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DLM2054
2	DIGITAL MULTIMETER	AGILENT	34970A
3	CURRENT PROBE	YOKOGAWA ELECT.	70193
4	CURRENT PROBE	HIOKI	3273
5	SHUNT RESISTER	YOKOGAWA ELECT.	2215
6	DYNAMIC DUMMY LOAD	TAKASAGO	FK-200L
7	DYNAMIC DUMMY LOAD	KIKUSUI	PLZ-164WL
8	CVCF	NF	ES10000S
9	DC POWER SUPPLY	TDK-Lambda	Z+100-8
10	CONTROLLED TEMP. CHAMBER	ESPEC	SU-261
11	EMI TEST RECEIVER / SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESR3
12	PRE AMP.	SONOMA	310N
13	AMN	KIKUSUI	KNW-242C
14	ANTENNA	SCHWARZBECK	BBA9106
15	ANTENNA	SCHWARZBECK	UHALP9107

2. 特性データ Characteristics

2-1. 静特性 Steady state characteristics

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

3.3V 1. Regulation - line and load Condition Ta : 25 ºC

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	3.2969V	3.2972V	3.2970V	3.2965V	0.7mV	0.021%
50% (2A)	3.2839V	3.2841V	3.2840V	3.2837V	0.4mV	0.012%
100% (4A)	3.2707V	3.2708V	3.2705V	3.2701V	0.7mV	0.021%
Load regulation	26.2mV	26.4mV	26.5mV	26.4mV		
	0.794%	0.800%	0.803%	0.800%		

2. Temperature drift Conditions Vin : 24 VDC
Io : 100 %

Ta	-20°C	25°C	70°C	Temperature stability	
Vo	3.2636V	3.2705V	3.2647V	6.9mV	0.209%

5V 1. Regulation - line and load Condition Ta : 25 °C

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	5.0153V	5.0161V	5.0156V	5.0145V	1.6mV	0.032%
50% (1.5A)	5.0063V	5.0069V	5.0064V	5.0055V	1.4mV	0.028%
100% (3A)	4.9971V	4.9973V	4.9971V	4.9971V	0.2mV	0.004%
Load regulation	18.2mV	18.8mV	18.5mV	17.4mV		
	0.364%	0.376%	0.370%	0.348%		

2. Temperature drift Conditions Vin : 24 VDC
Io : 100 %

Ta	-20°C	25°C	70°C	Temperature stability	
Vo	4.9782V	4.9971V	5.0005V	22.3mV	0.446%

12V 1. Regulation - line and load Condition Ta : 25 °C

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	12.0893V	12.0907V	12.0909V	12.0906V	1.6mV	0.013%
50% (0.65A)	12.0850V	12.0858V	12.0863V	12.0856V	1.3mV	0.011%
100% (1.3A)	12.0810V	12.0818V	12.0818V	12.0816V	0.8mV	0.007%
Load regulation	8.3mV	8.9mV	9.1mV	9.0mV		
	0.069%	0.074%	0.076%	0.075%		

2. Temperature drift Conditions Vin : 24 VDC
Io : 100 %

Ta	-20°C	25°C	70°C	Temperature stability	
Vo	12.0810V	12.0818V	12.0856V	4.6mV	0.038%

15V 1. Regulation - line and load Condition Ta : 25 °C

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	15.0759V	15.0781V	15.0785V	15.0783V	2.6mV	0.017%
50% (0.5A)	15.0730V	15.0744V	15.0750V	15.0747V	2.0mV	0.013%
100% (1A)	15.0708V	15.0717V	15.0717V	15.0717V	0.9mV	0.006%
Load regulation	5.1mV	6.4mV	6.8mV	6.6mV		
	0.034%	0.043%	0.045%	0.044%		

2. Temperature drift Conditions Vin : 24 VDC
Io : 100 %

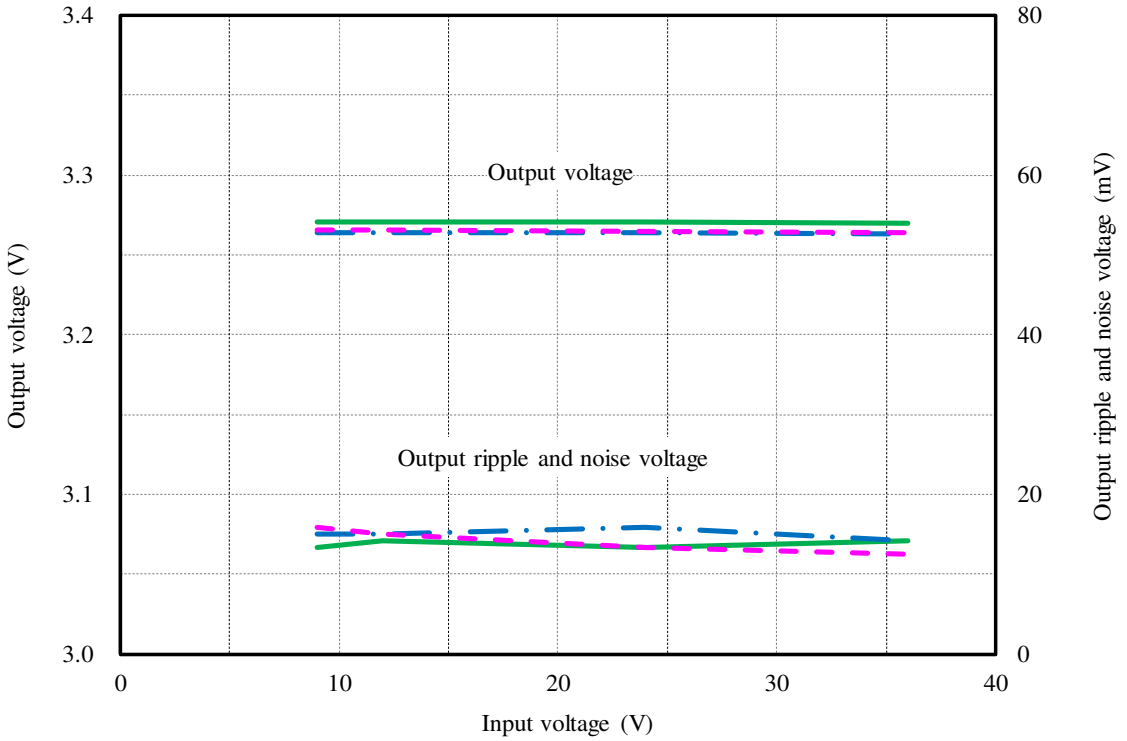
Ta	-20°C	25°C	70°C	Temperature stability	
Vo	15.0651V	15.0717V	15.0955V	30.4mV	0.203%

(2) 出力電圧・出力リップルノイズ電圧 対 入力電圧

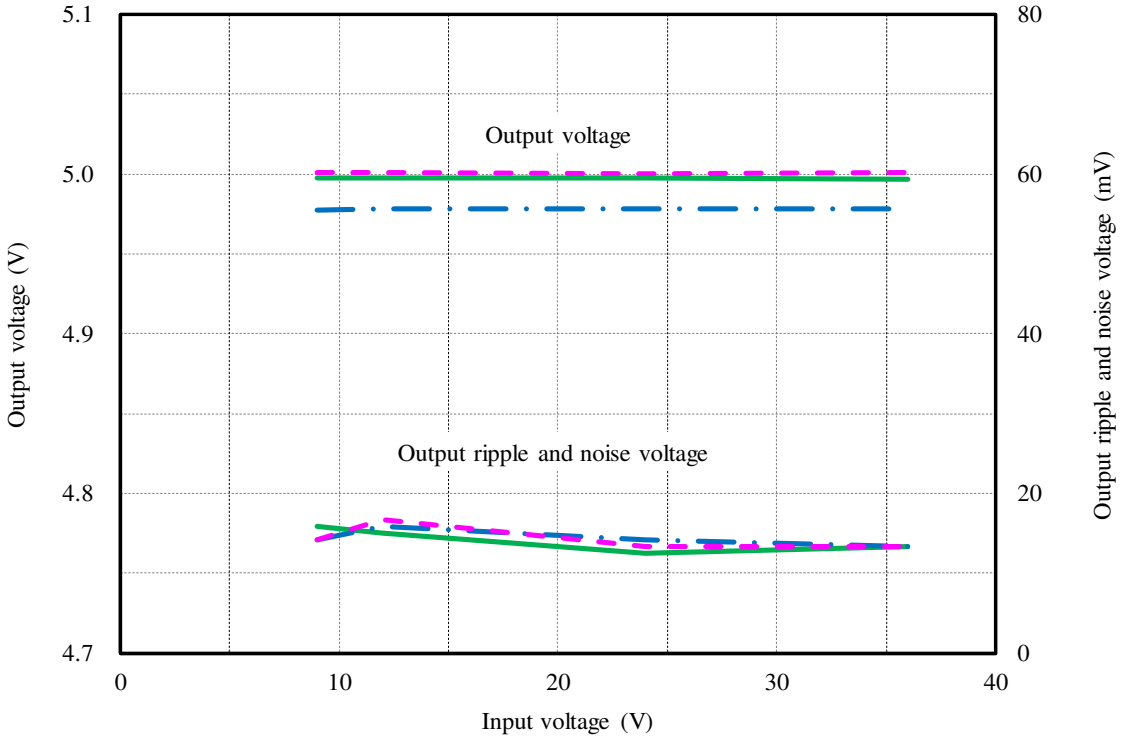
Output voltage and Output ripple and noise voltage vs. Input voltage

Conditions Io : 100 %
Ta : -20 ℃
: 25 ℃
: 70 ℃

3.3V



5V

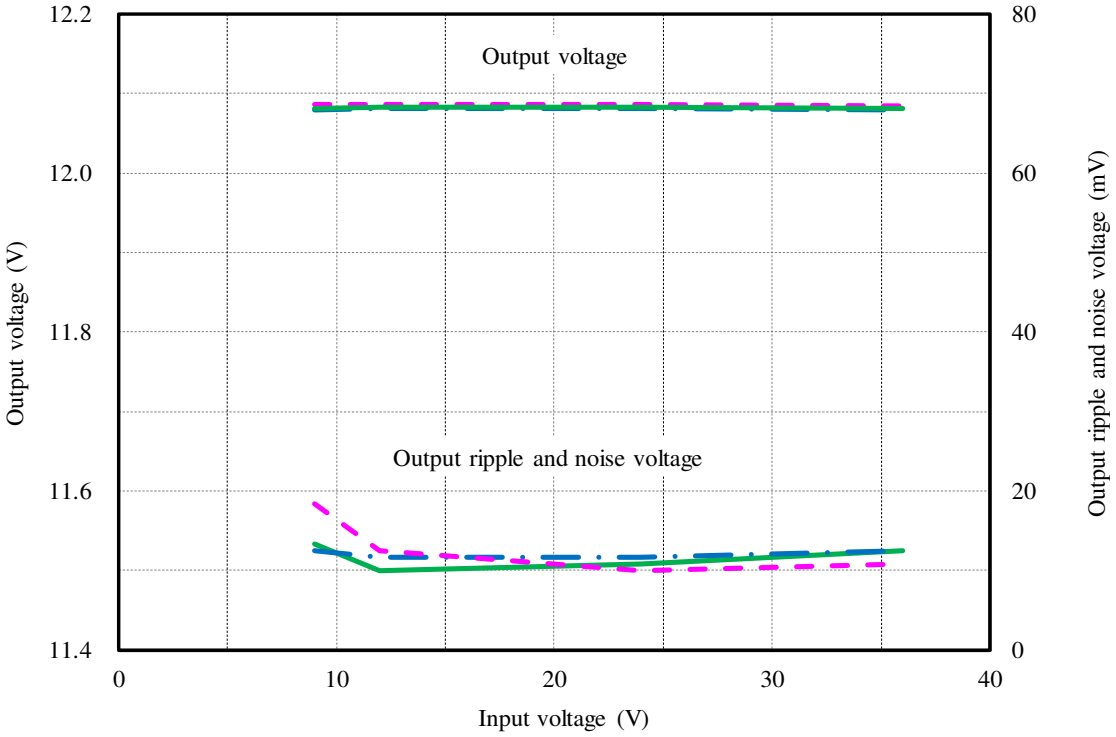


(2) 出力電圧・出力リップルノイズ電圧 対 入力電圧

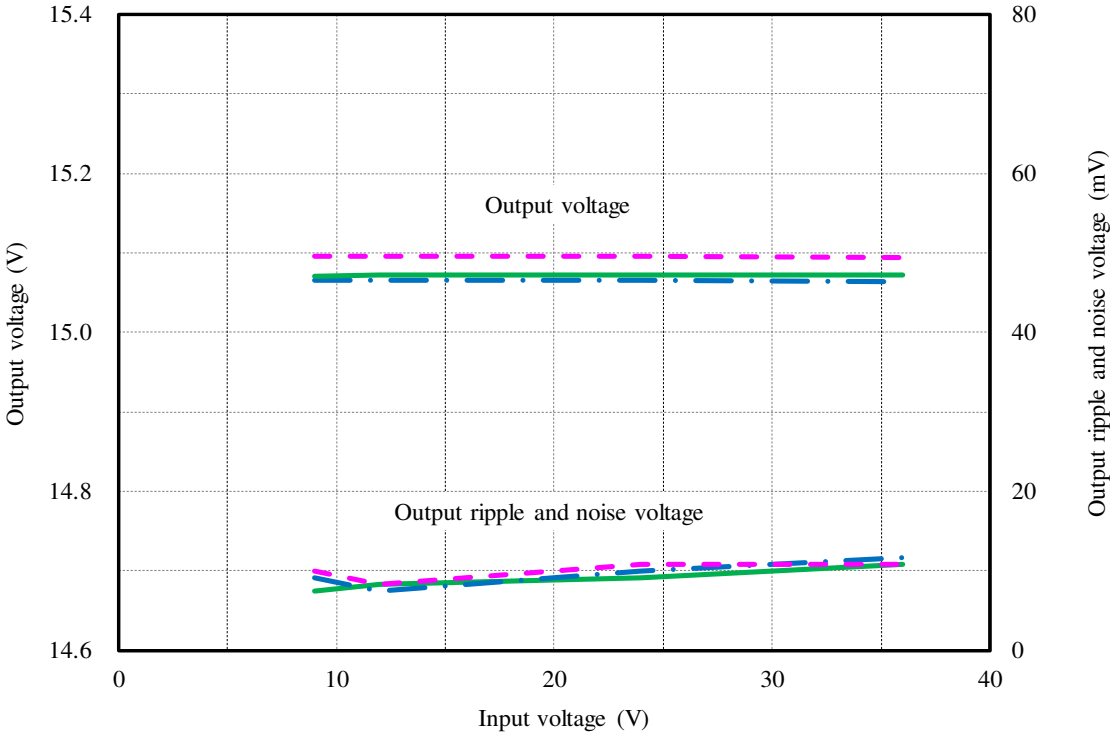
Output voltage and Output ripple and noise voltage vs. Input voltage

Conditions Io : 100 %
Ta : -20 ℃
: 25 ℃
: 70 ℃

12V



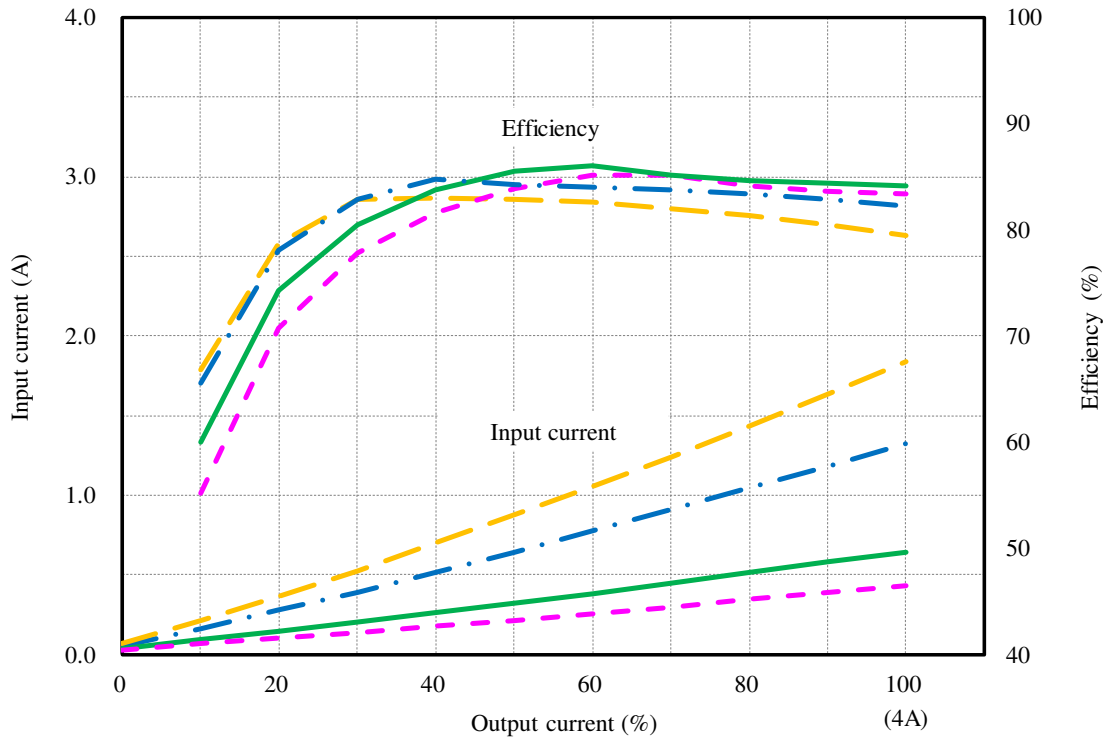
15V



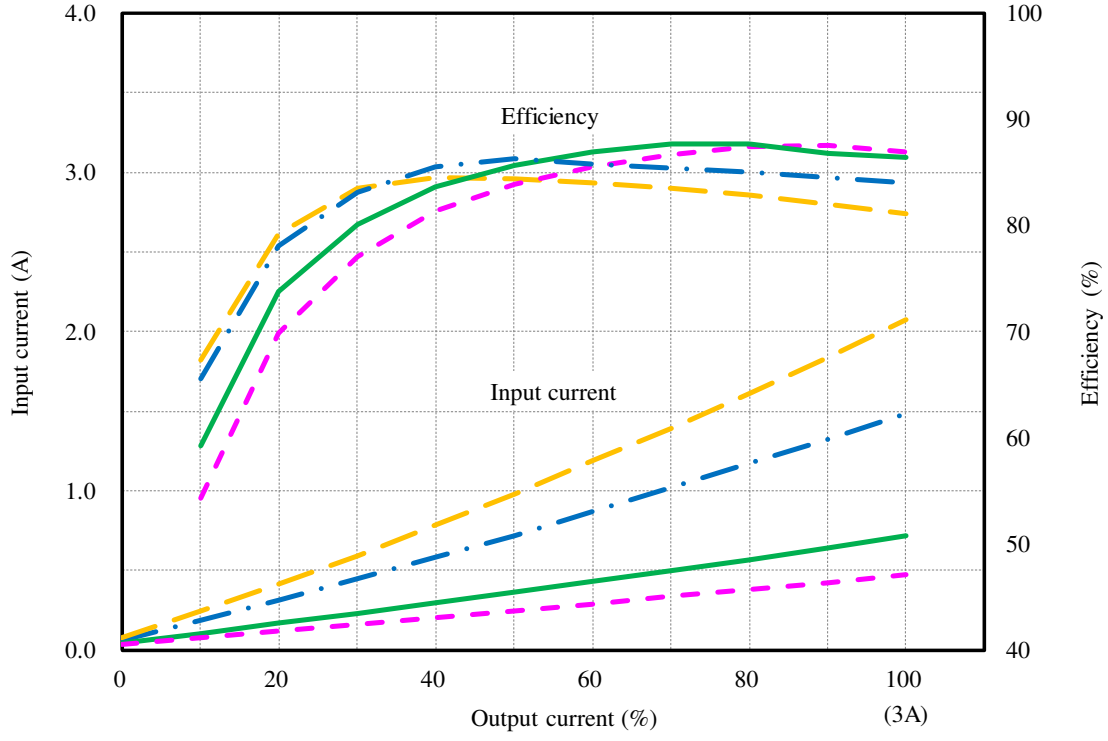
(3) 入力電流･効率 対 出力電流 Input current and Efficiency vs. Output current

Conditions Vin : 9 VDC
: 12 VDC
: 24 VDC
: 36 VDC
Ta : 25 °C

3.3V



5V



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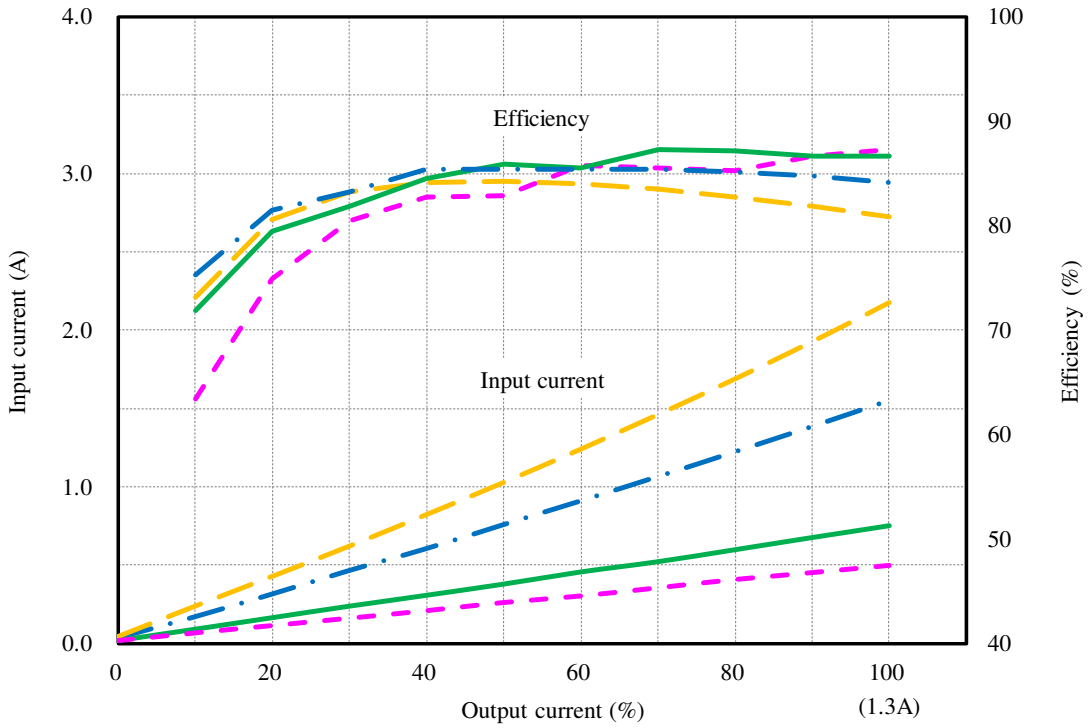
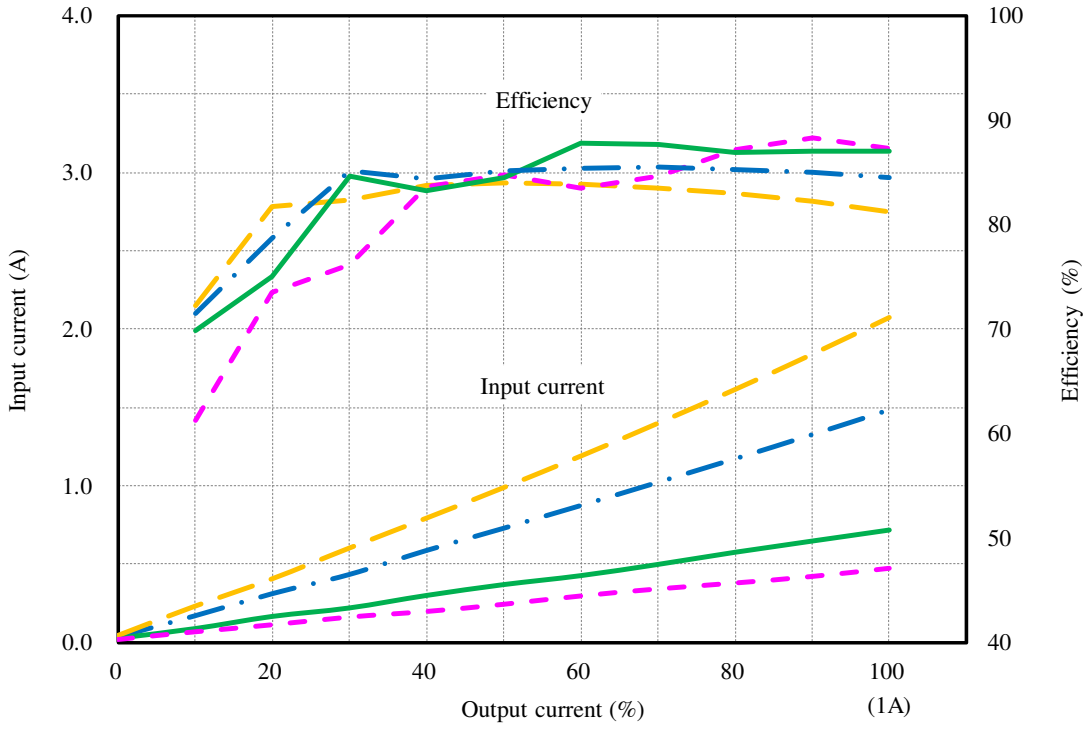
: 24 VDC
: 36 VDC
Ta : 25 ℃

12V



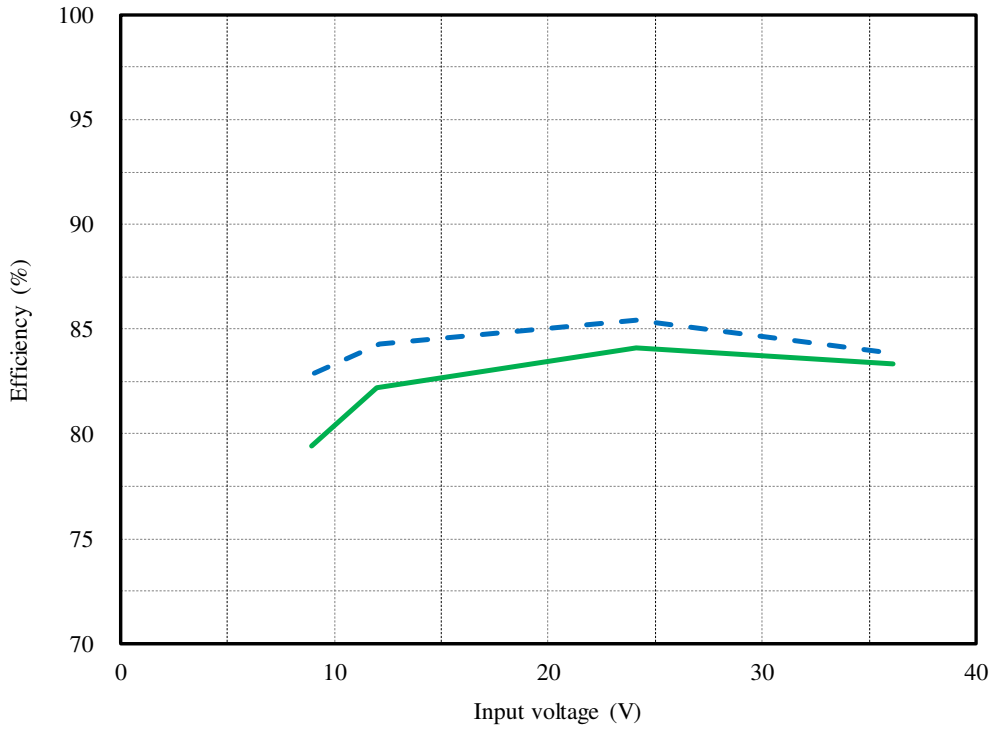
15V



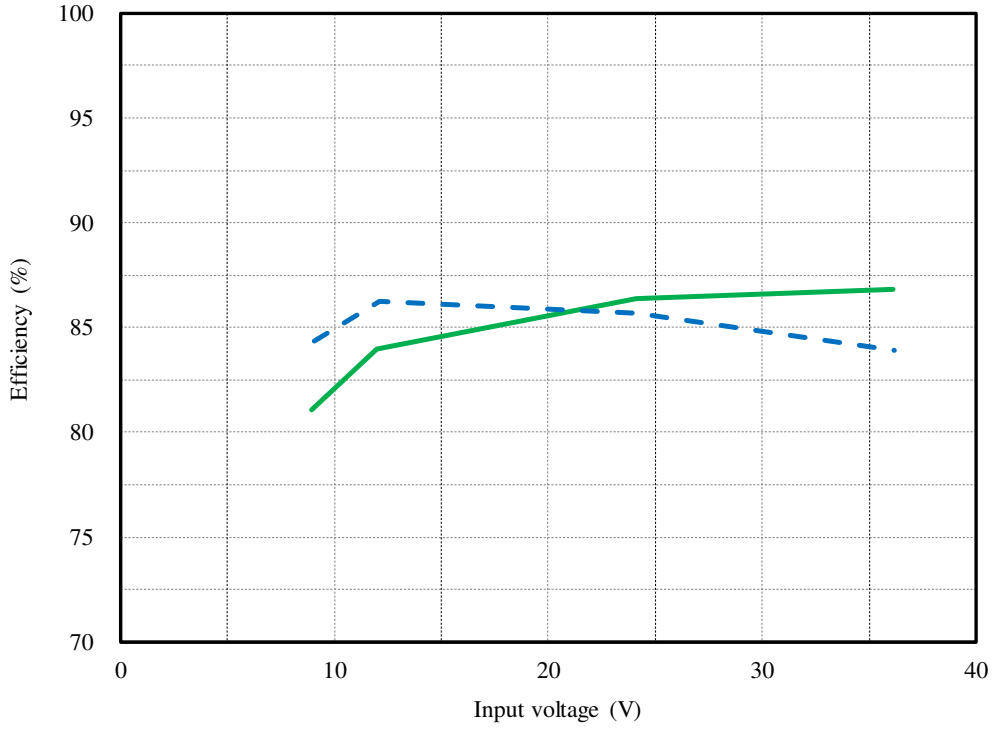
(4) 効率 対 入力電圧 Efficiency vs. Input voltage

Conditions Io : 50 %
: 100 %
Ta : 25 °C

3.3V



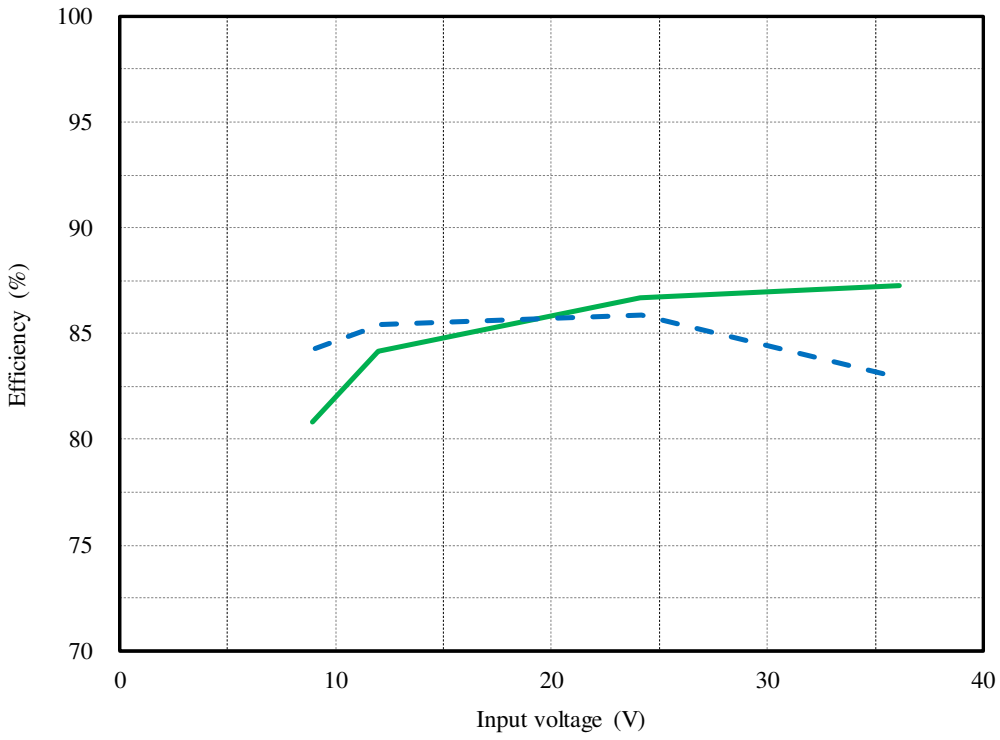
5V



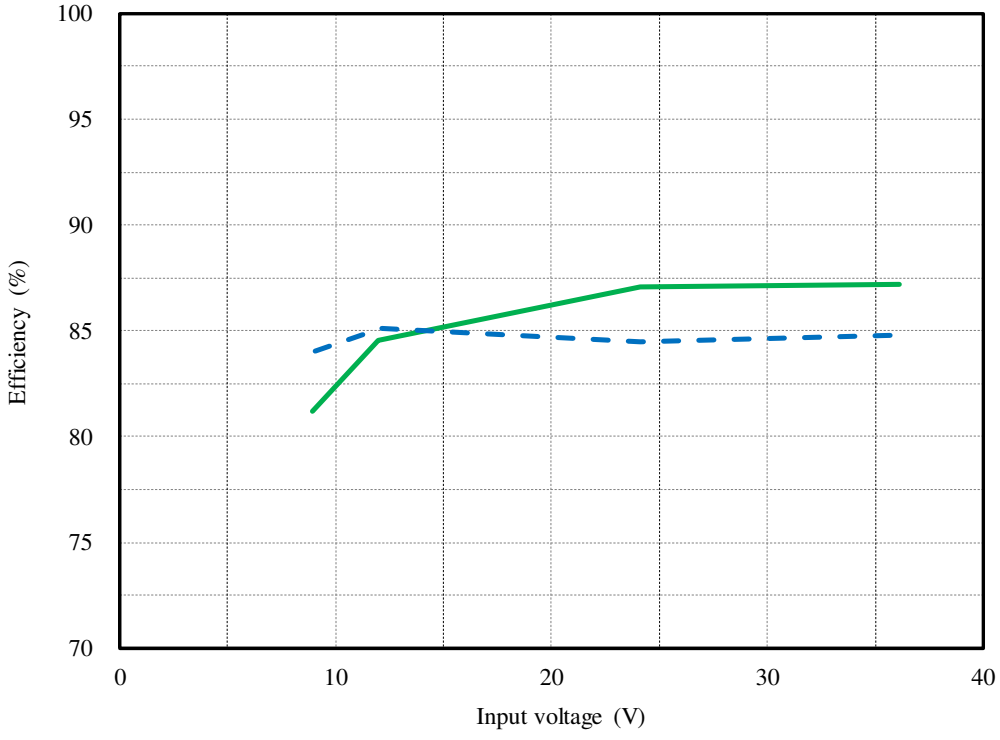
(4) 効率 対 入力電圧 Efficiency vs. Input voltage

Conditions Io : 50 %
: 100 %
Ta : 25 °C

12V



15V



(5) 起動･遮断電圧特性 Start up and Drop out voltage characteristics

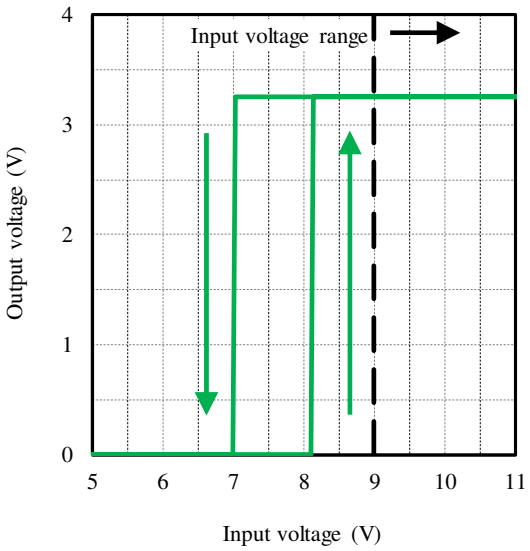
出力電圧 対 入力電圧
Output voltage vs. Input voltage

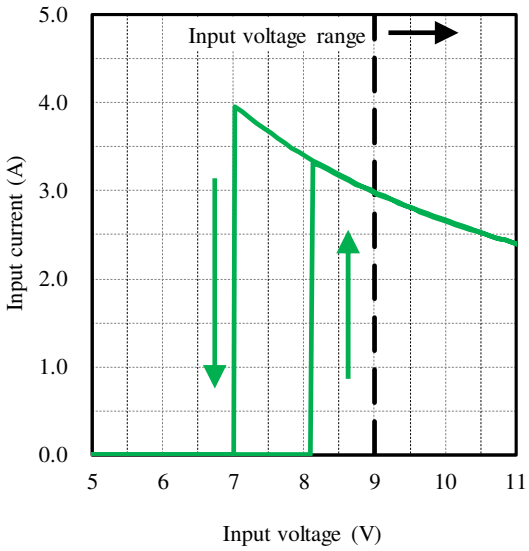
Conditions Io : 100 %
Ta : 25 °C

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

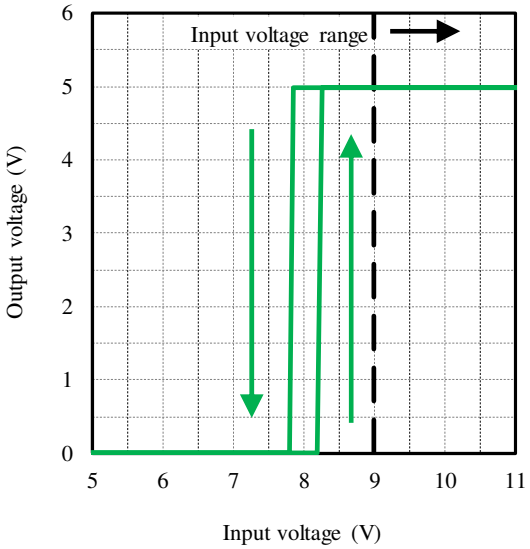
Conditions Io : 100 %
Ta : 25 °C

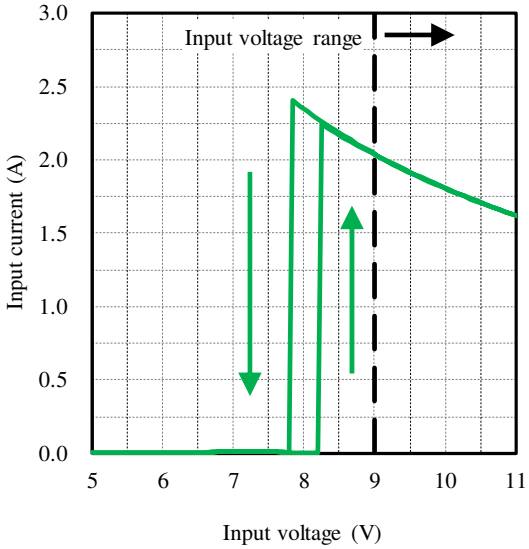
3.3V





5V





(5) 起動･遮断電圧特性 Start up and Drop out voltage characteristics

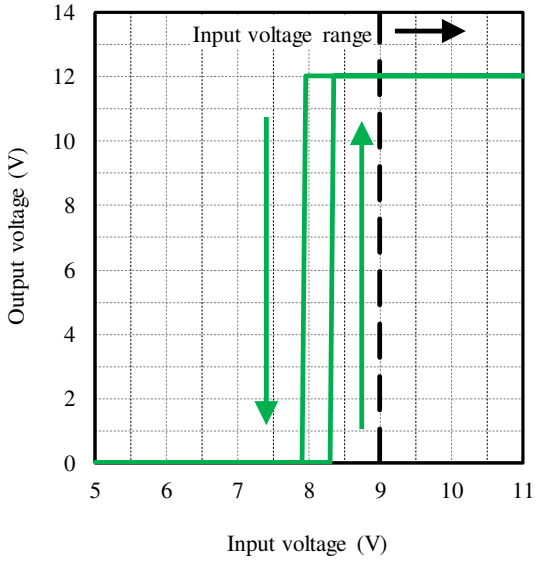
出力電圧 対 入力電圧
Output voltage vs. Input voltage

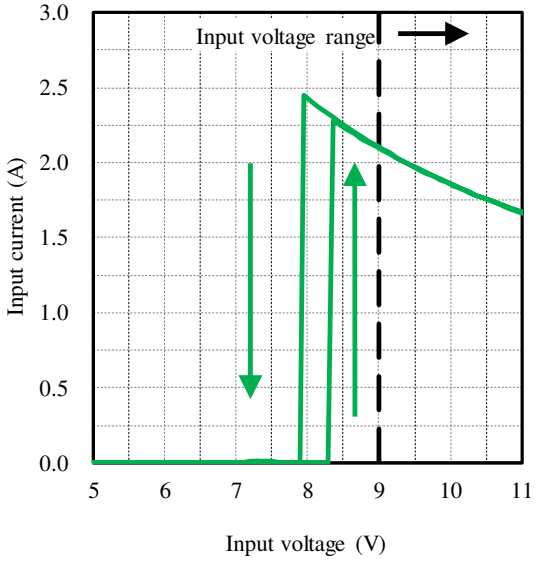
Conditions Io : 100 %
Ta : 25 °C

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

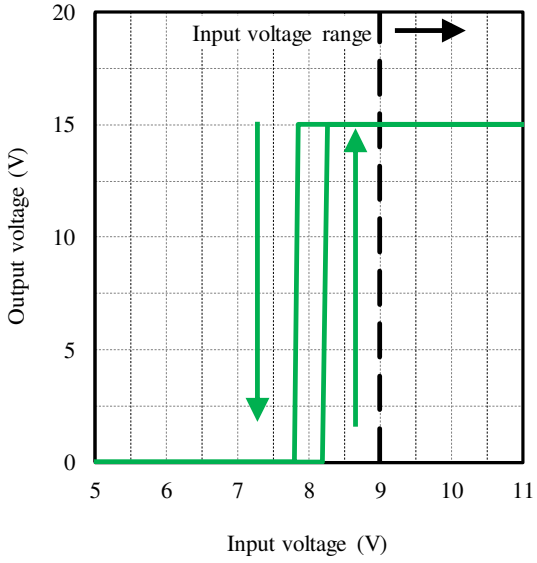
Conditions Io : 100 %
Ta : 25 °C

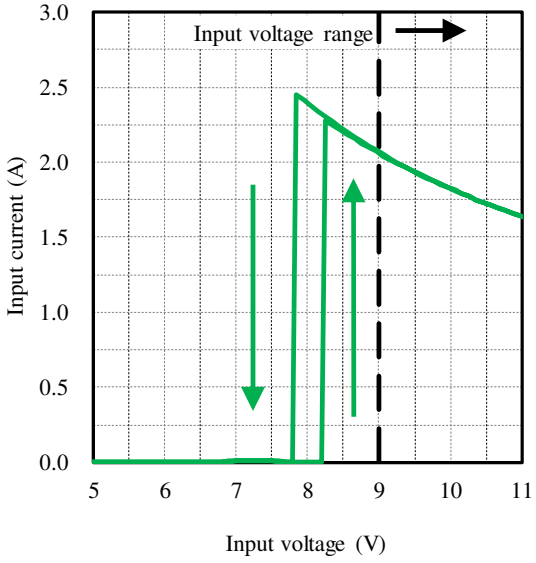
12V





15V

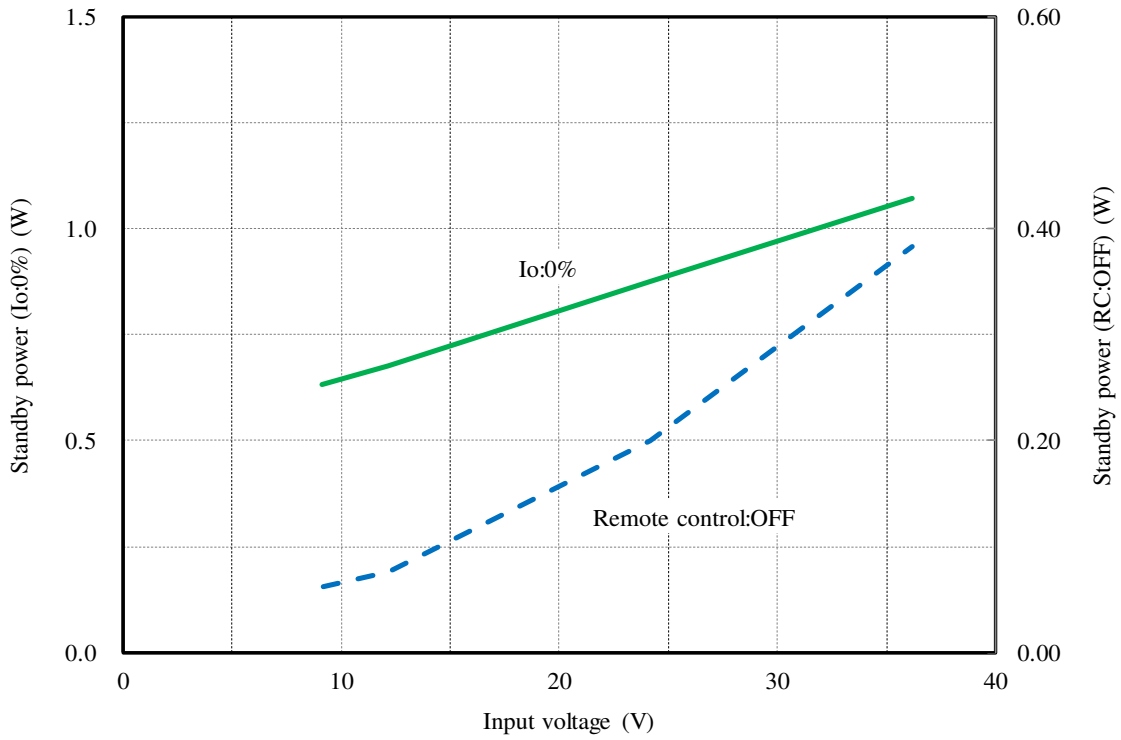




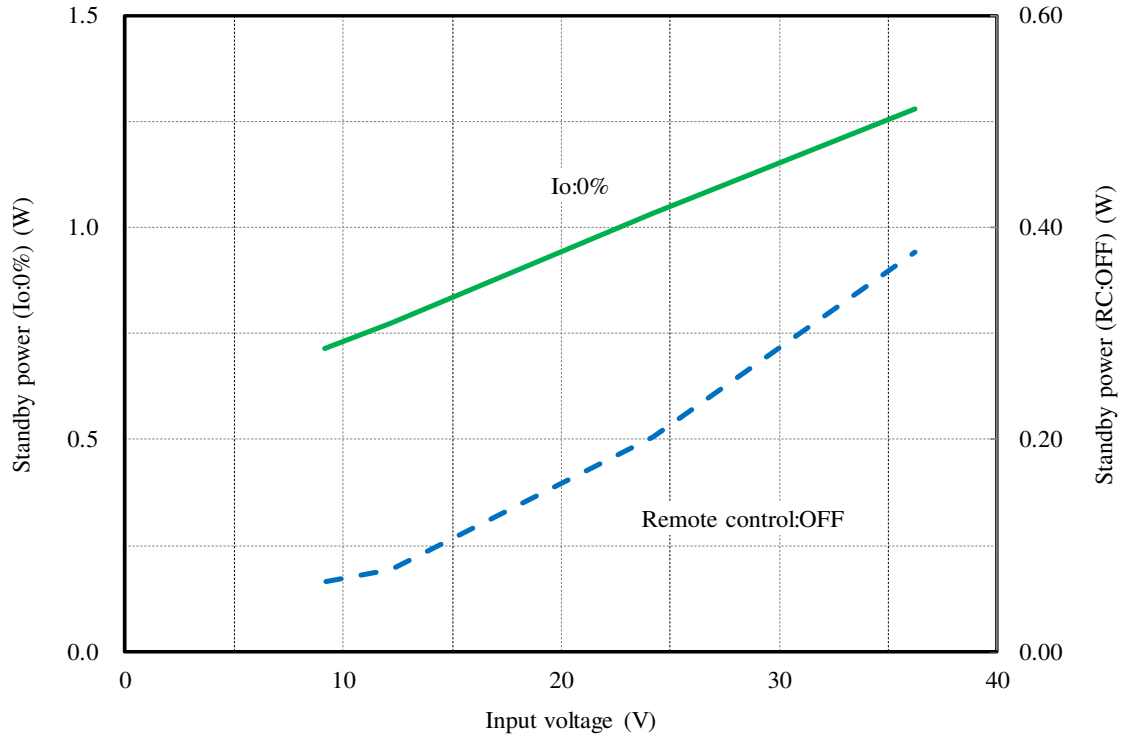
2-2. 待機電力特性 Standby power characteristics

Condition Ta : 25 ℃

3.3V



5V



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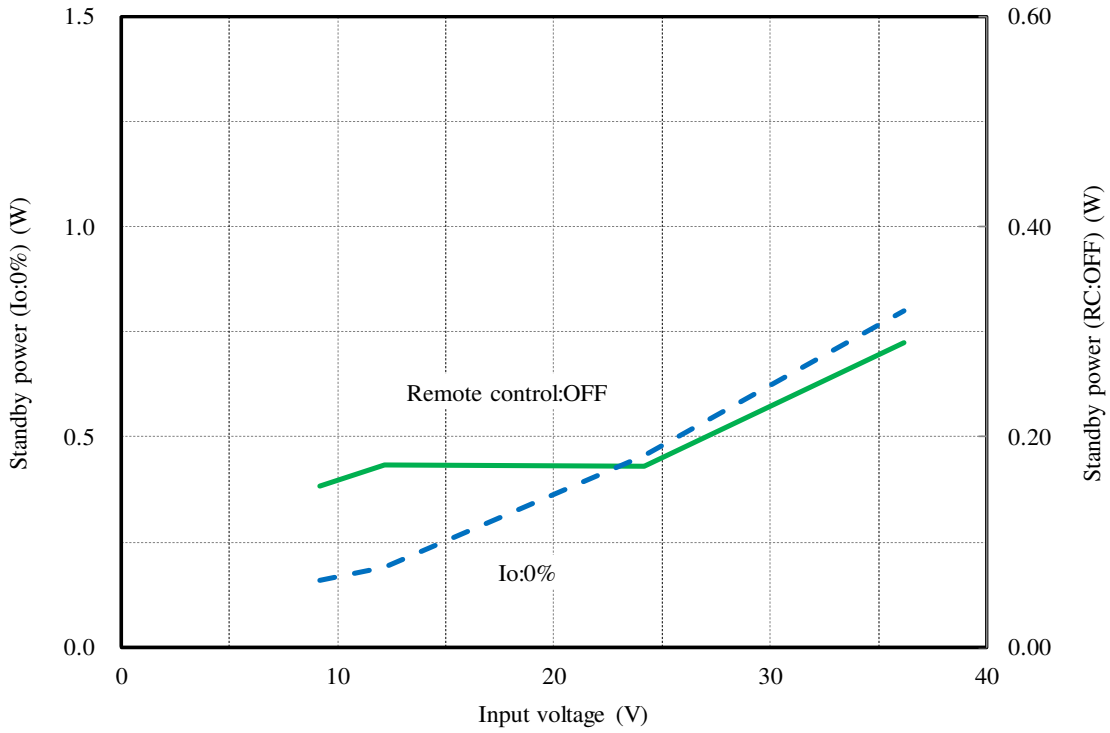
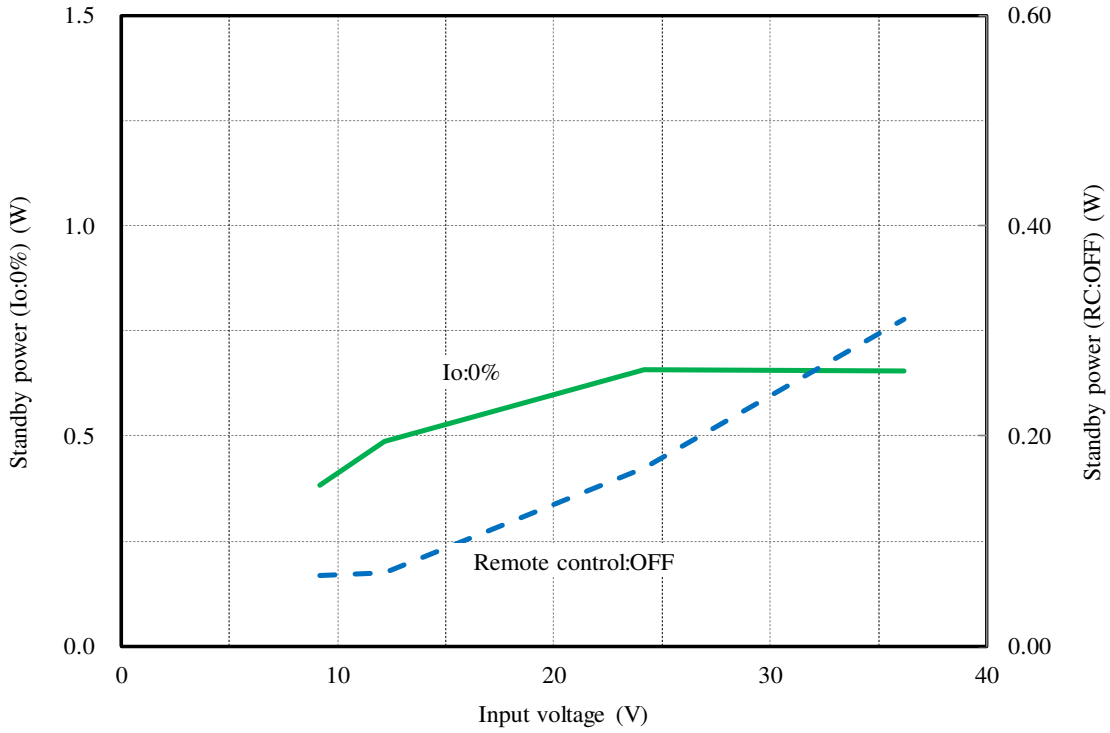
Condition Ta : 25 °C

12V



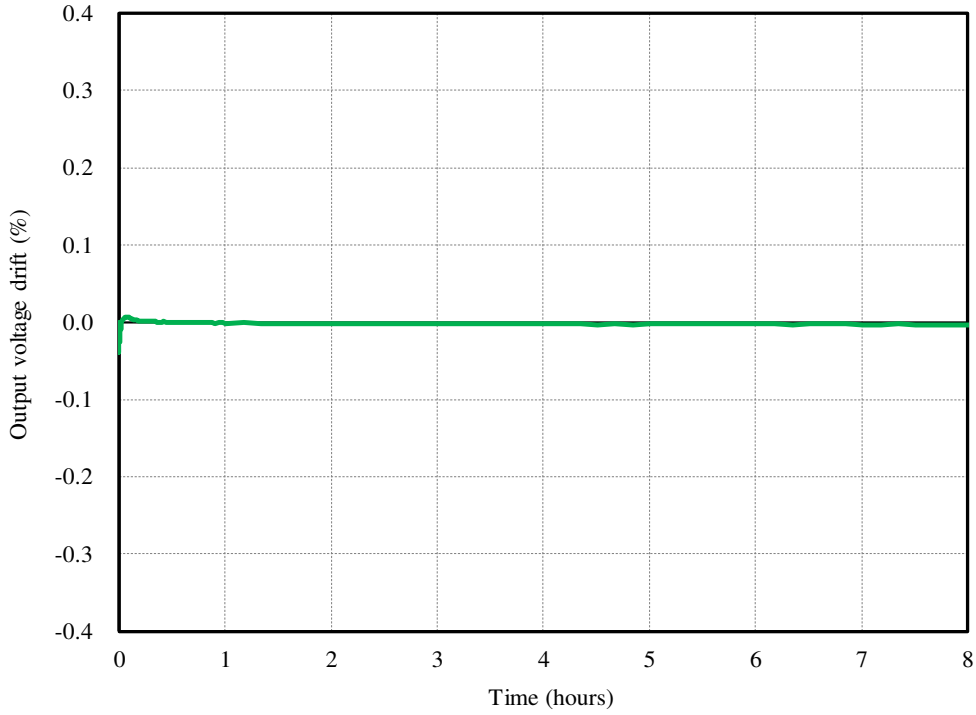
15V



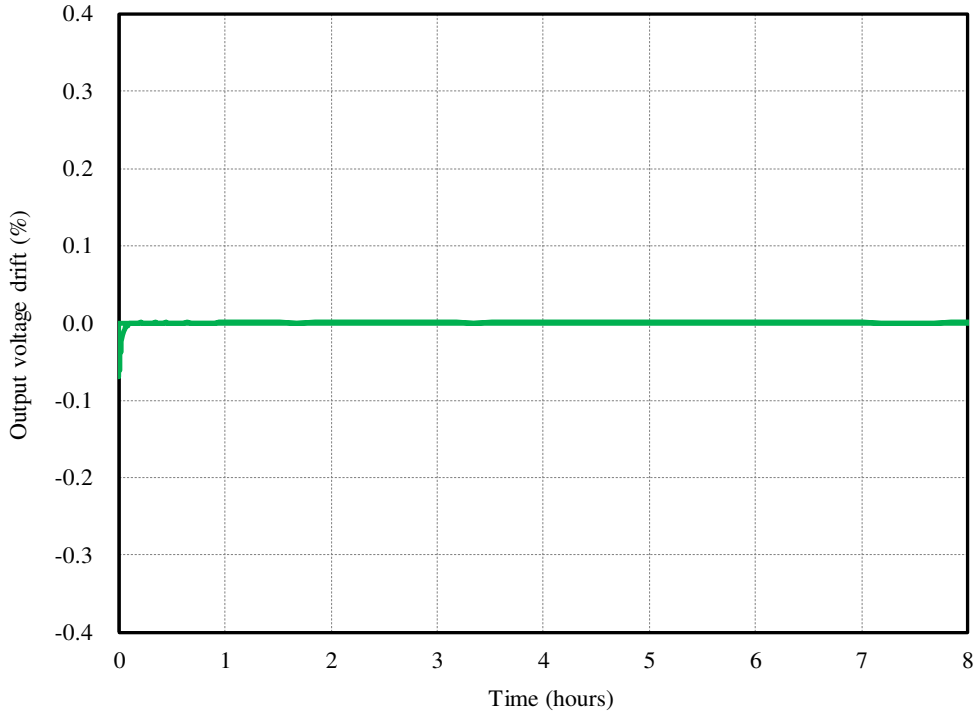
2-3. 通電ドリフト特性 Warm up voltage drift characteristics

Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ℃

3.3V



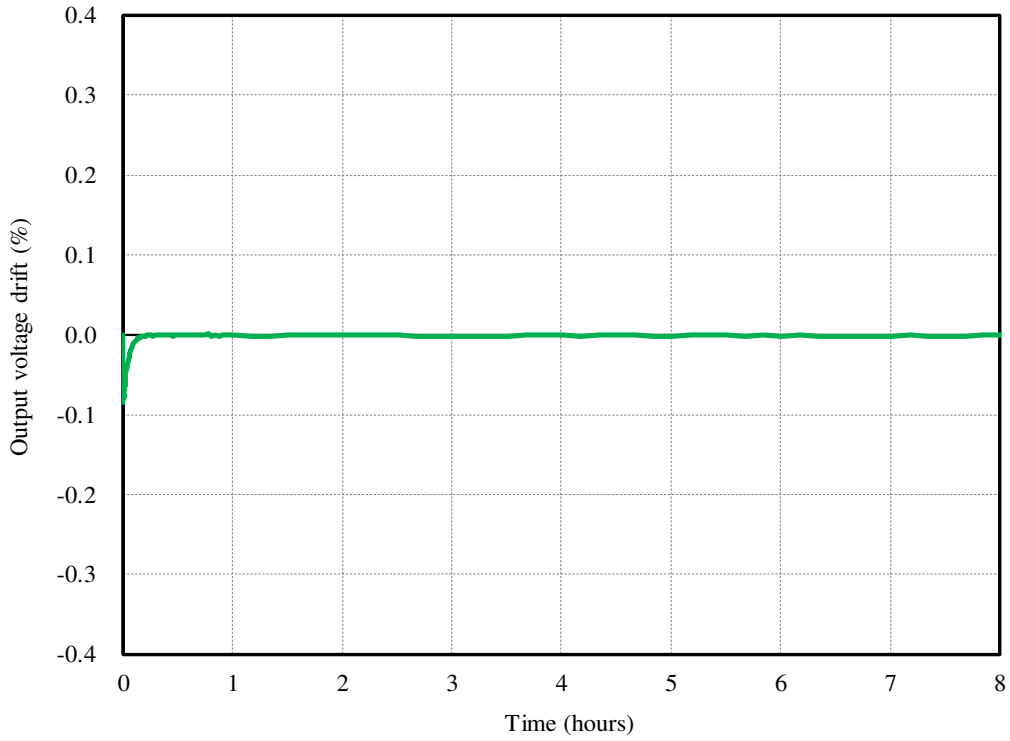
5V



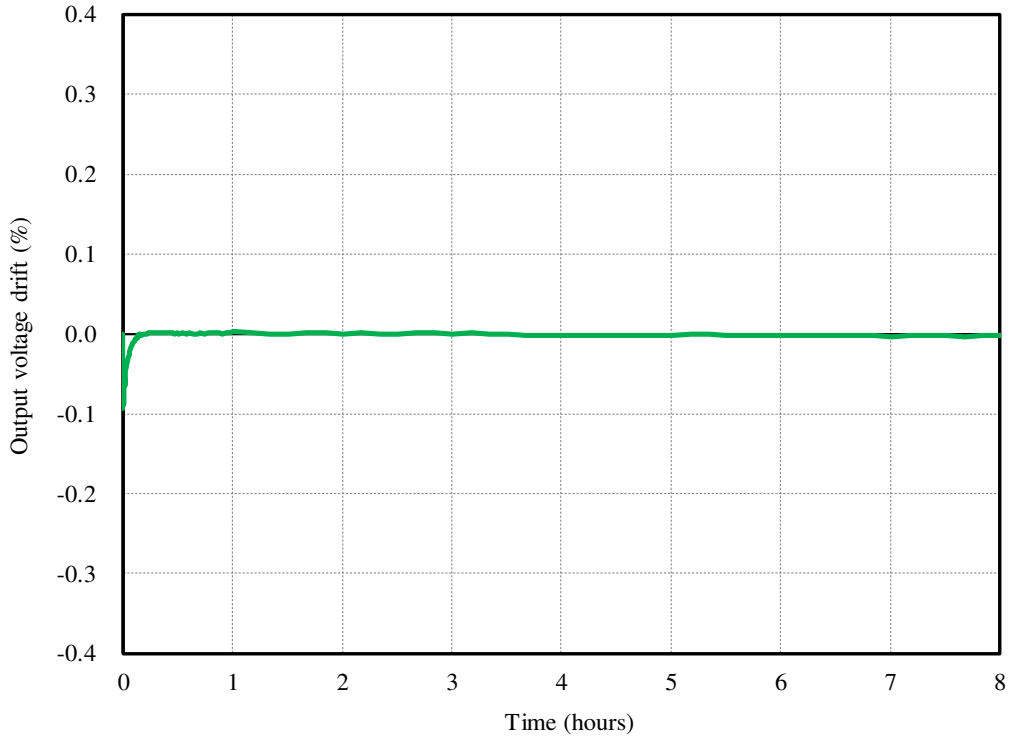
2-3. 通電ドリフト特性 Warm up voltage drift characteristics

Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ℃

12V



15V



2-4. 過電流保護特性 Over current protection (OCP) characteristics

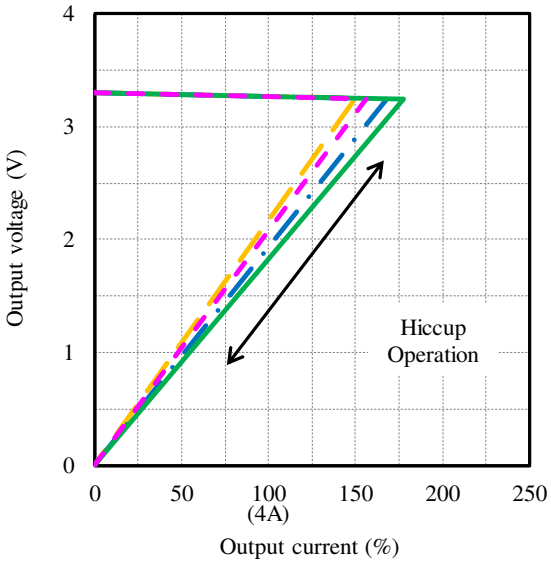
入力電圧依存性
Input voltage dependence

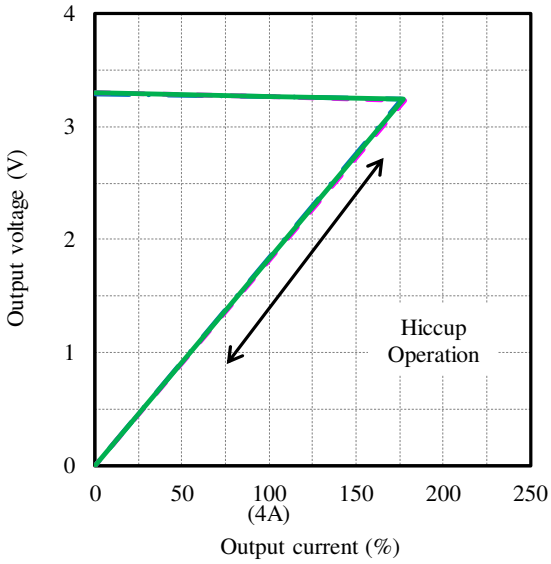
Conditions Vin : 9 VDC
: 12 VDC
: 24 VDC
: 36 VDC
Ta : 25 °C

周囲温度依存性
Ambient temperature dependence

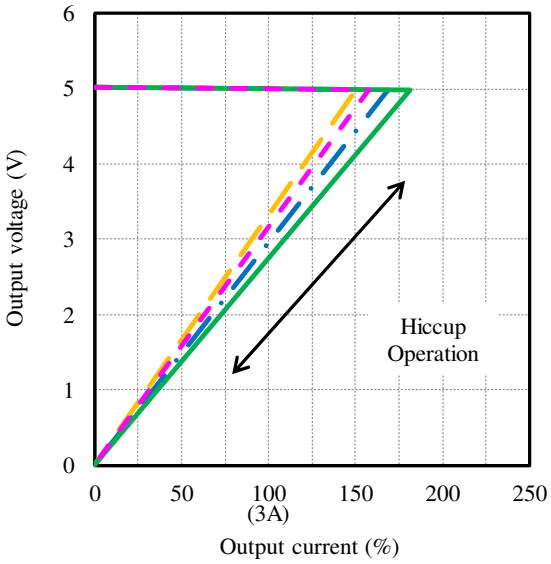
Conditions Vin : 24 VDC
Ta : -20 °C
: 25 °C
: 70 °C

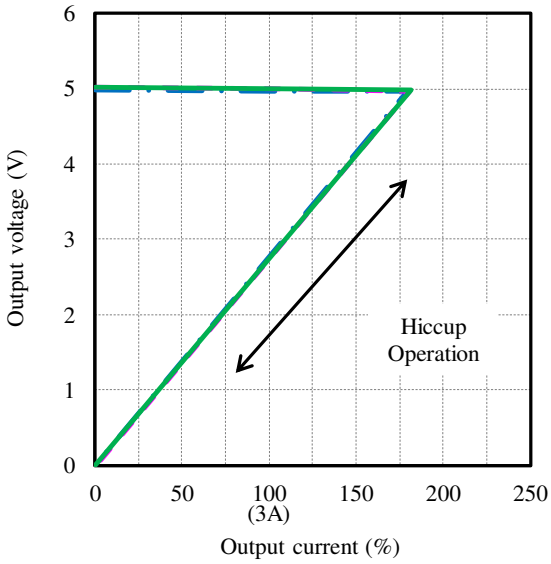
3.3V





5V



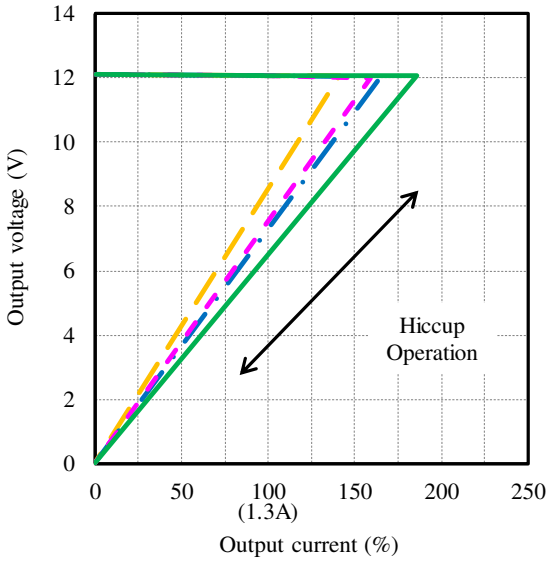


2-4. 過電流保護特性 Over current protection (OCP) characteristics

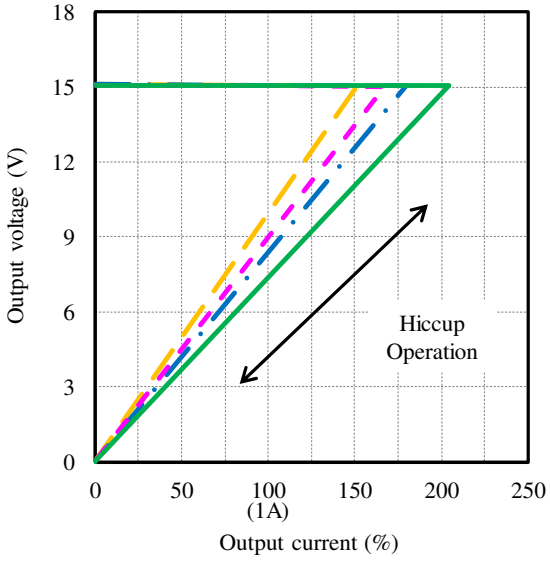
入力電圧依存性
Input voltage dependence

Conditions Vin : 9 VDC
: 12 VDC
: 24 VDC
: 36 VDC
Ta : 25 °C

12V

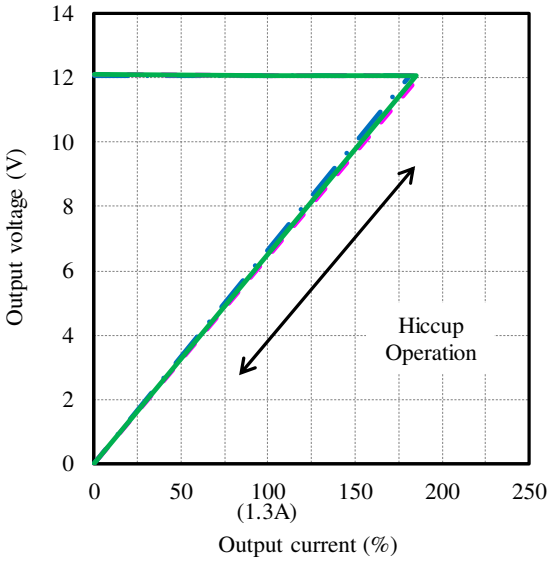


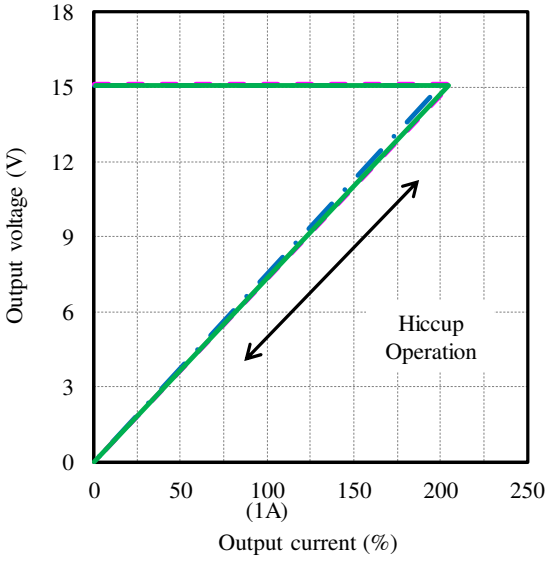
15V



周囲温度依存性
Ambient temperature dependence

Conditions Vin : 24 VDC
Ta : -20 °C
: 25 °C
: 70 °C

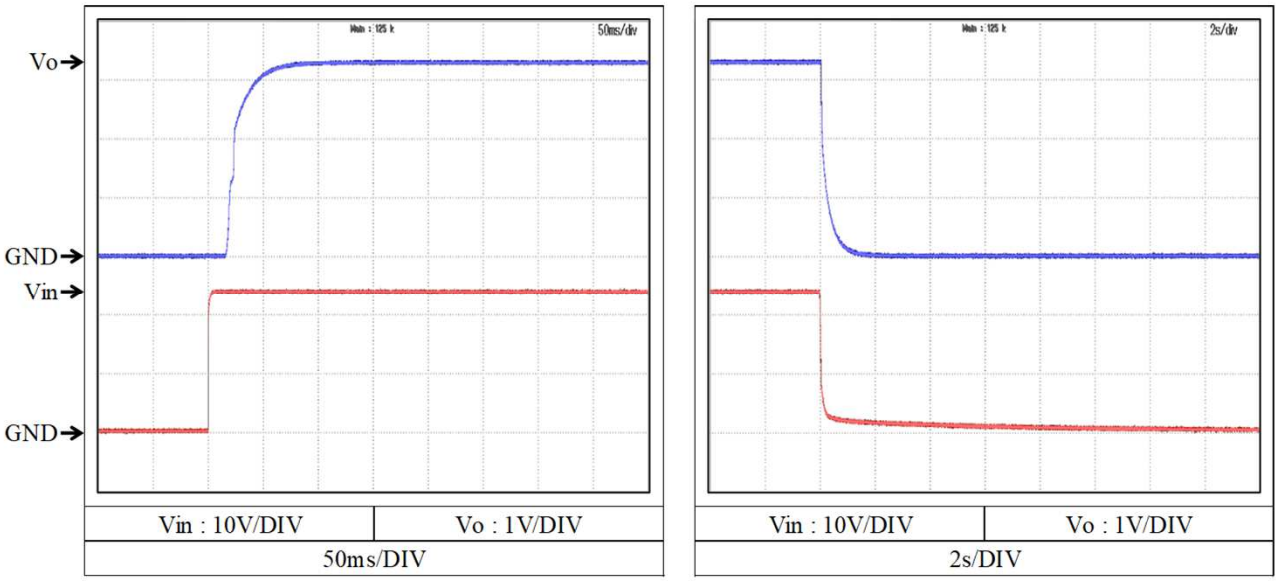




2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

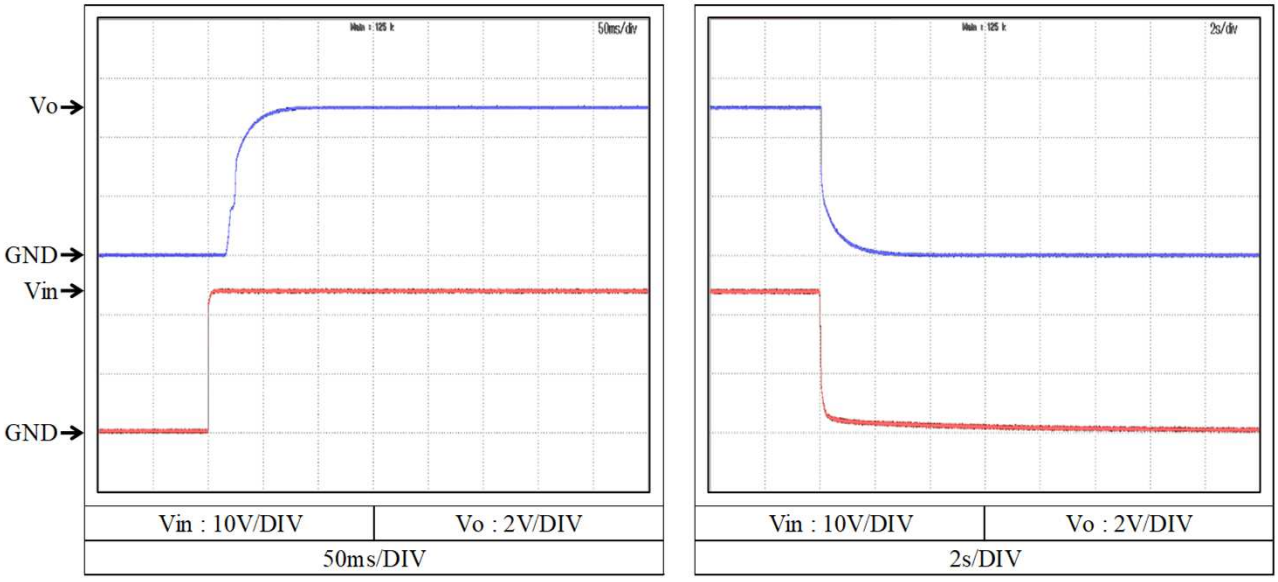
Conditions Vin : 24 VDC
Io : 0 %
Ta : 25 °C

3.3V



Vin : 10V/DIV	Vo : 1V/DIV	Vin : 10V/DIV	Vo : 1V/DIV
50ms/DIV		2s/DIV	

5V

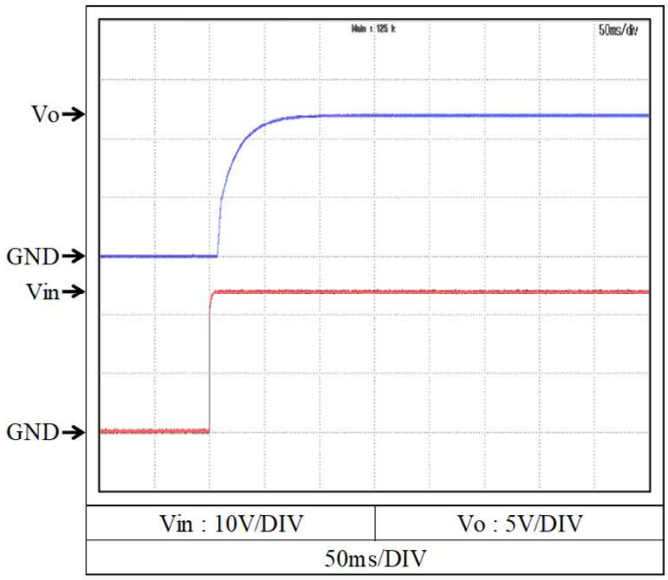


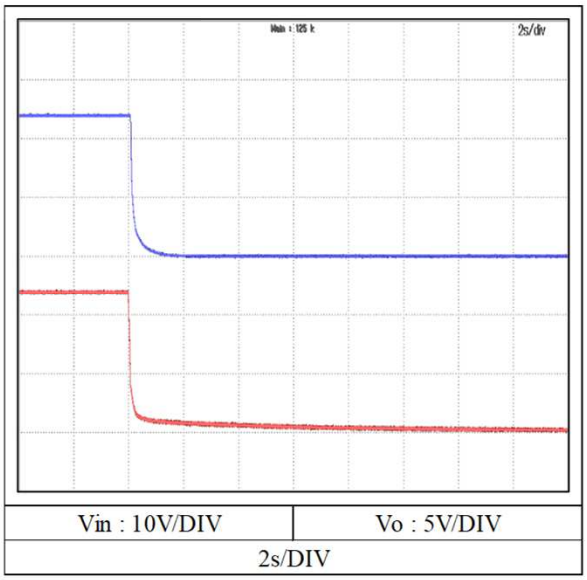
Vin : 10V/DIV	Vo : 2V/DIV	Vin : 10V/DIV	Vo : 2V/DIV
50ms/DIV		2s/DIV	

2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

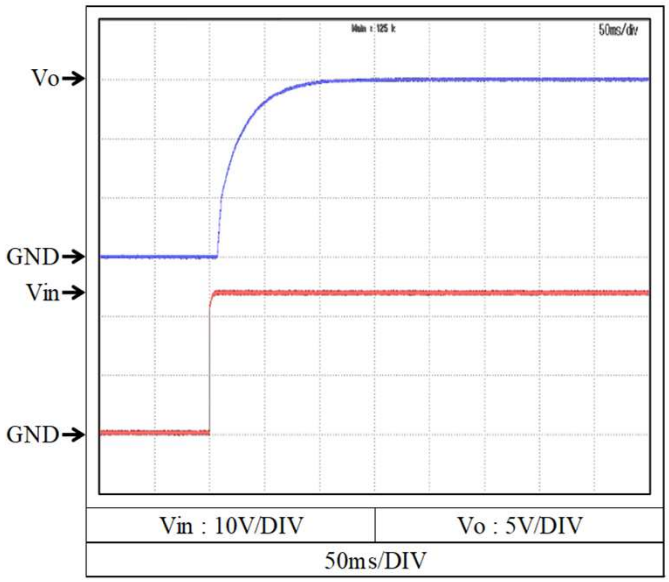
Conditions Vin : 24 VDC
Io : 0 %
Ta : 25 °C

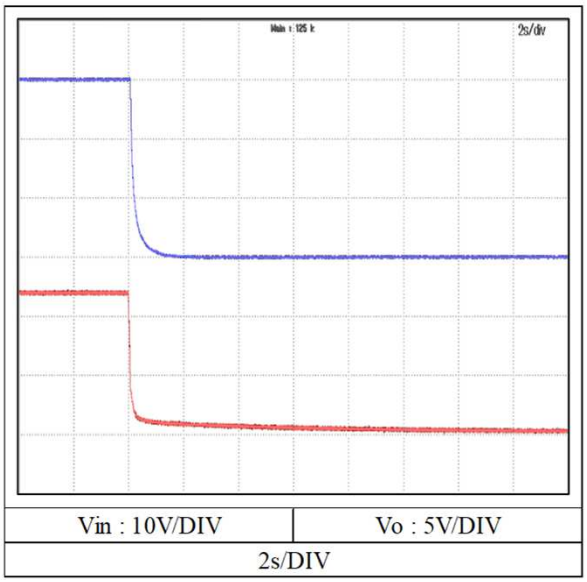
12V





15V

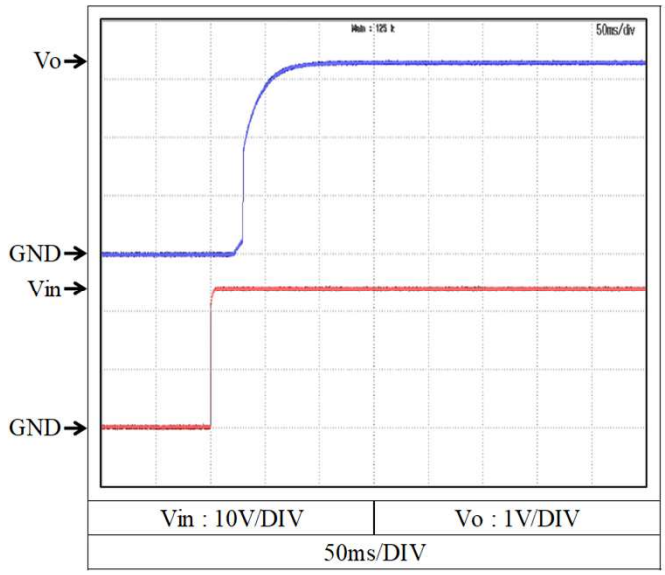




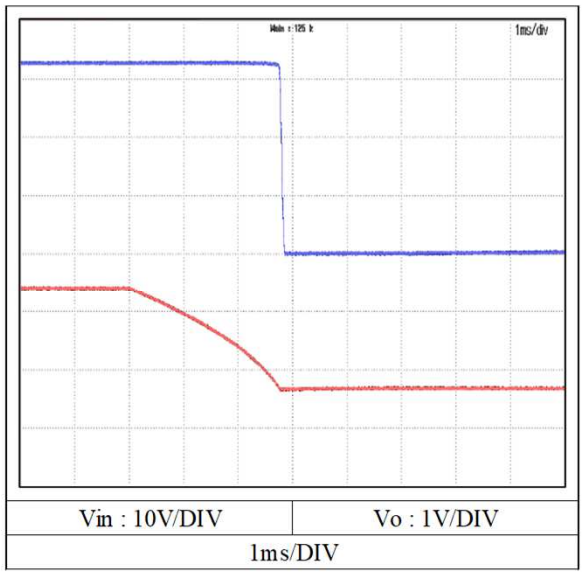
2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 °C

3.3V

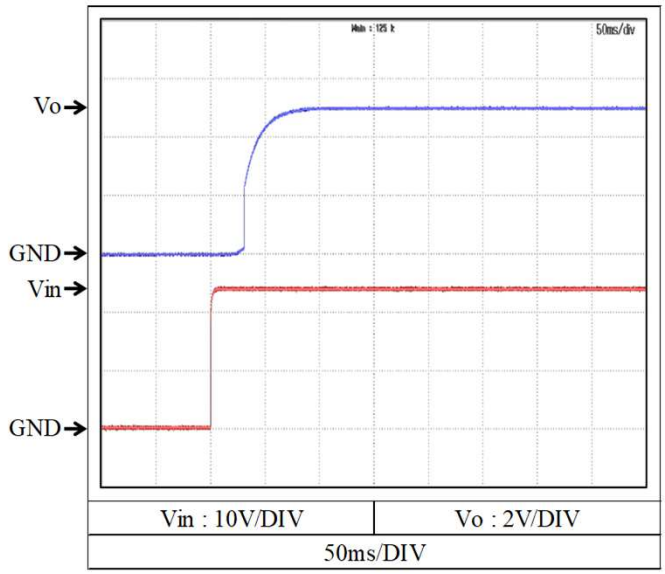


Vin : 10V/DIV | Vo : 1V/DIV
50ms/DIV

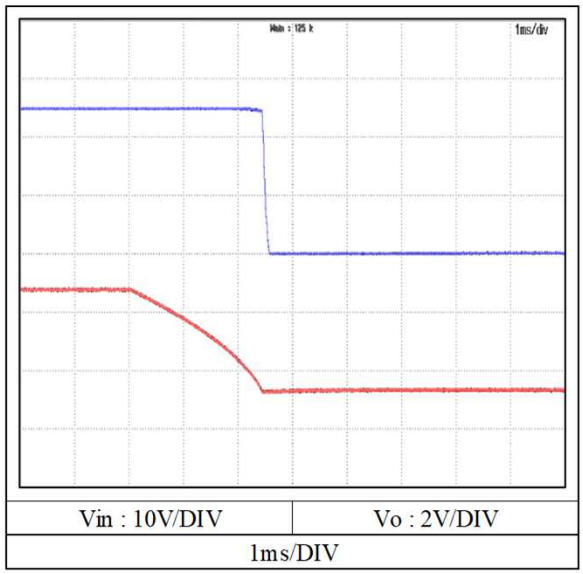


Vin : 10V/DIV | Vo : 1V/DIV
1ms/DIV

5V



Vin : 10V/DIV | Vo : 2V/DIV
50ms/DIV

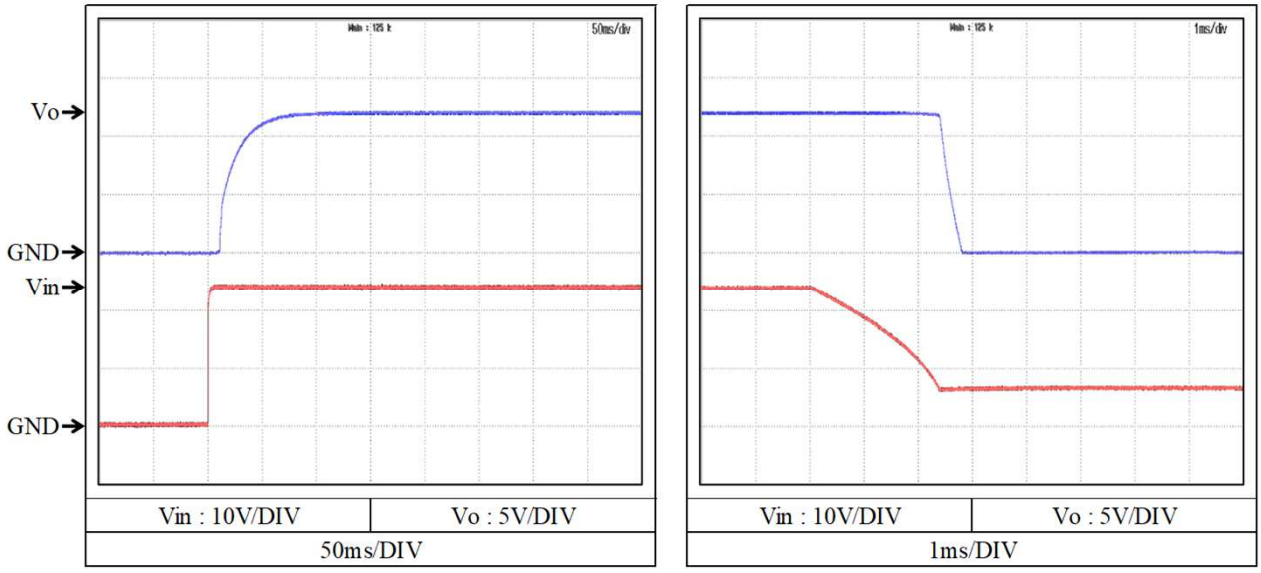


Vin : 10V/DIV | Vo : 2V/DIV
1ms/DIV

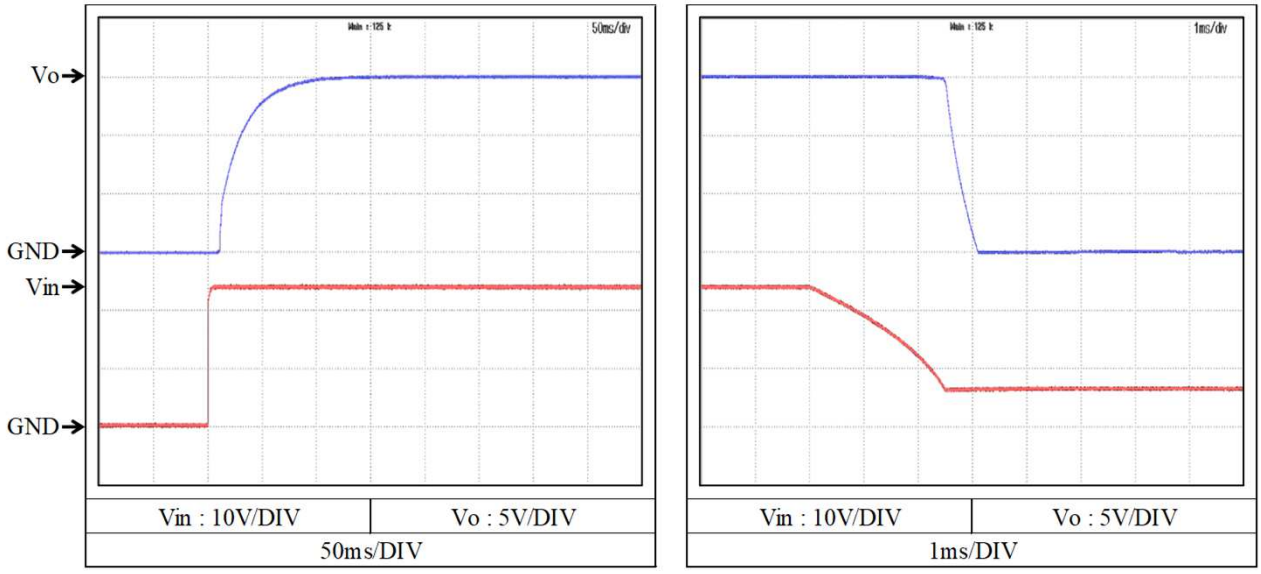
2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 °C

12V



15V

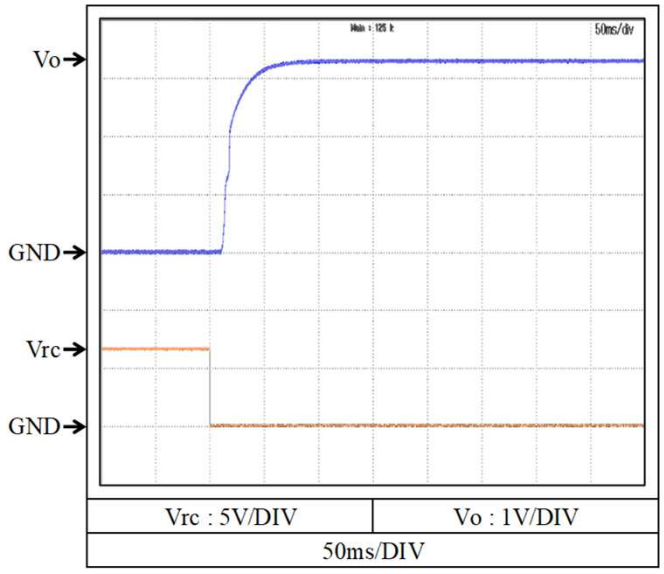


2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

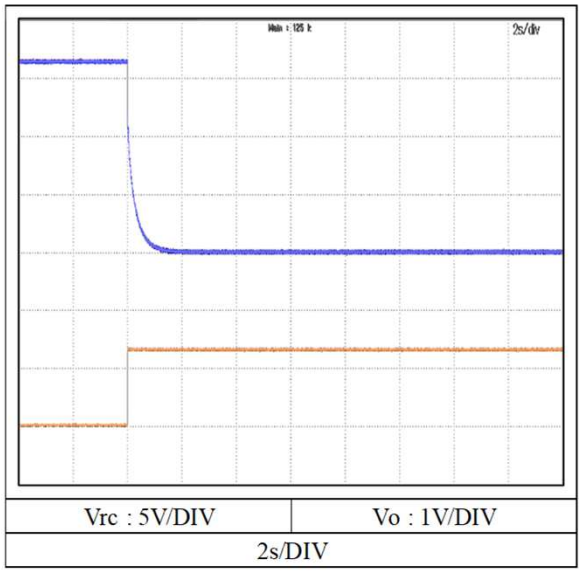
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

Conditions Vin : 24 VDC
Io : 0 %
Ta : 25 °C

3.3V

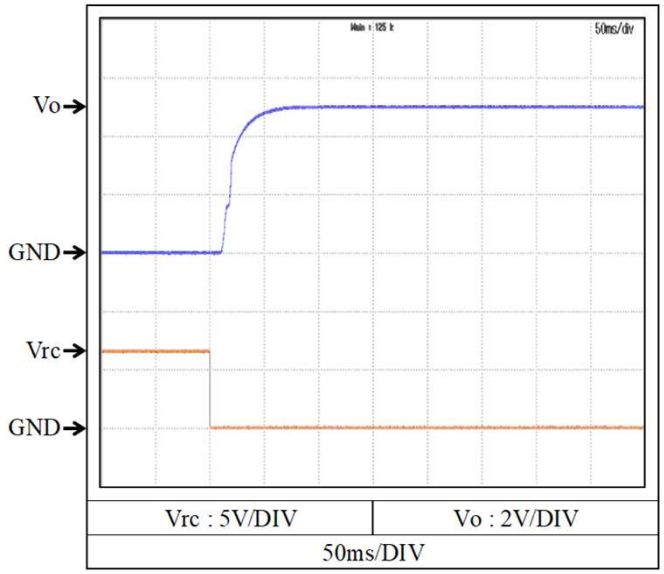


Vrc : 5V/DIV | Vo : 1V/DIV
50ms/DIV

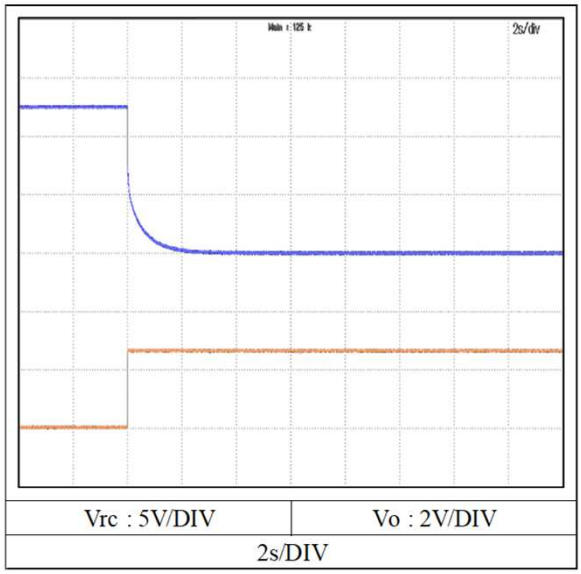


Vrc : 5V/DIV | Vo : 1V/DIV
2s/DIV

5V



Vrc : 5V/DIV | Vo : 2V/DIV
50ms/DIV



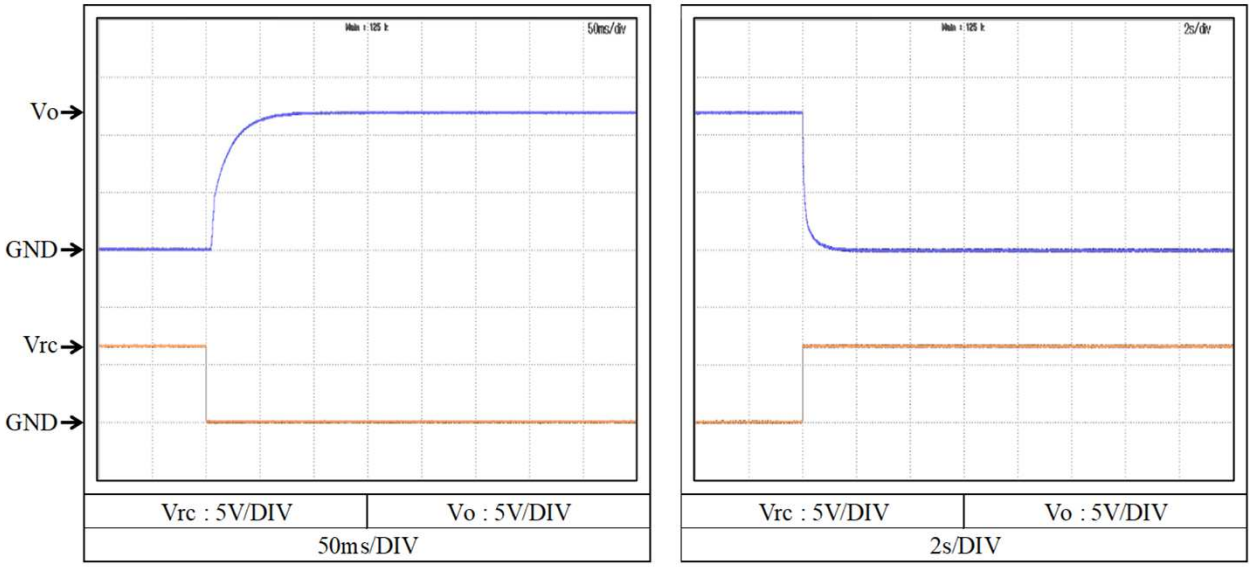
Vrc : 5V/DIV | Vo : 2V/DIV
2s/DIV

2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

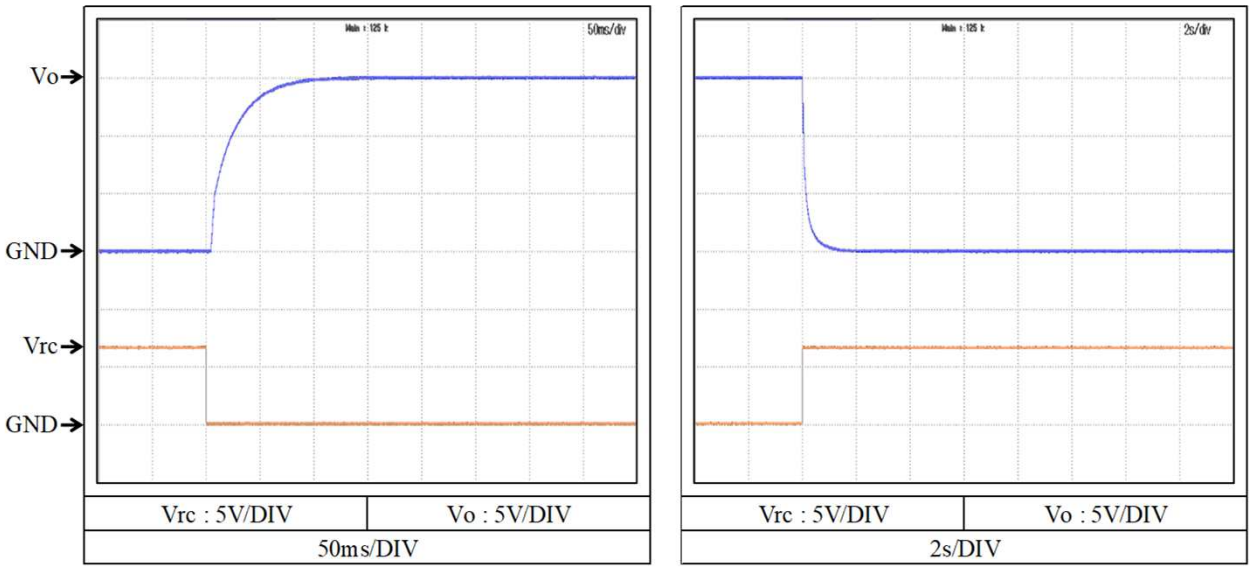
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

Conditions Vin : 24 VDC
Io : 0 %
Ta : 25 °C

12V



15V

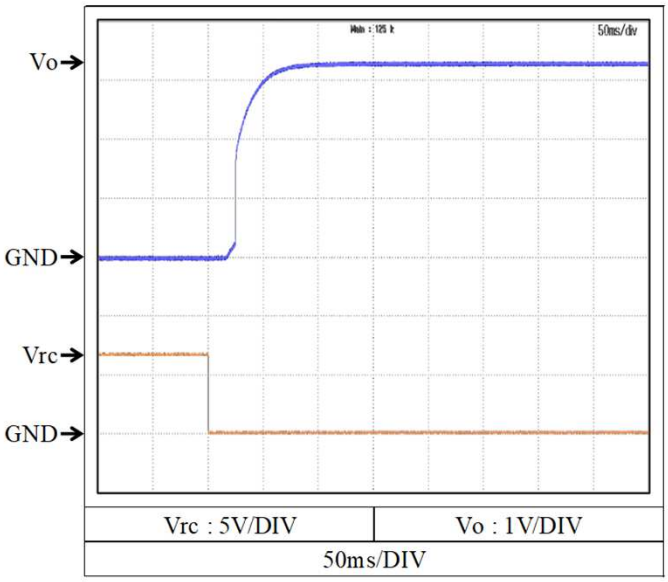


2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

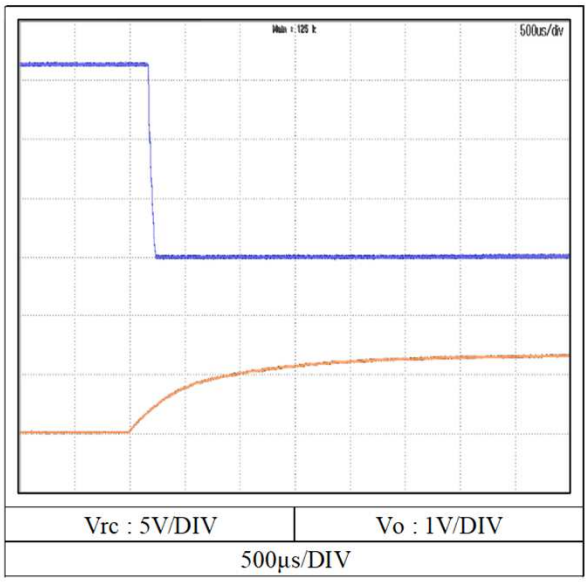
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 °C

3.3V

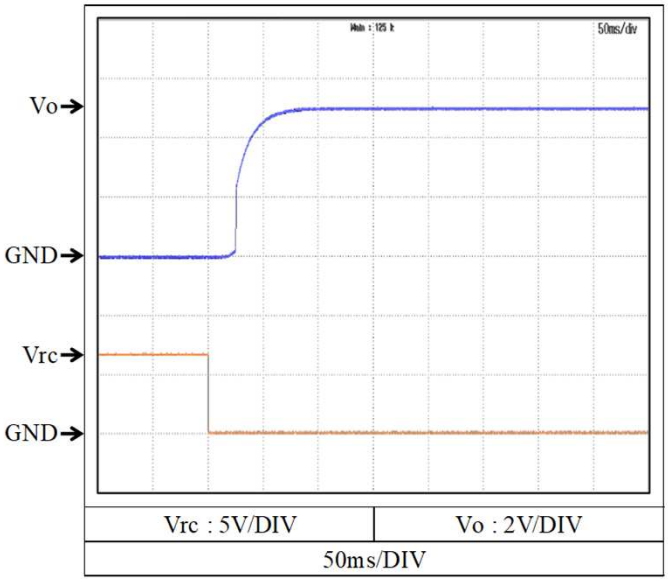


Vrc : 5V/DIV | Vo : 1V/DIV
50ms/DIV

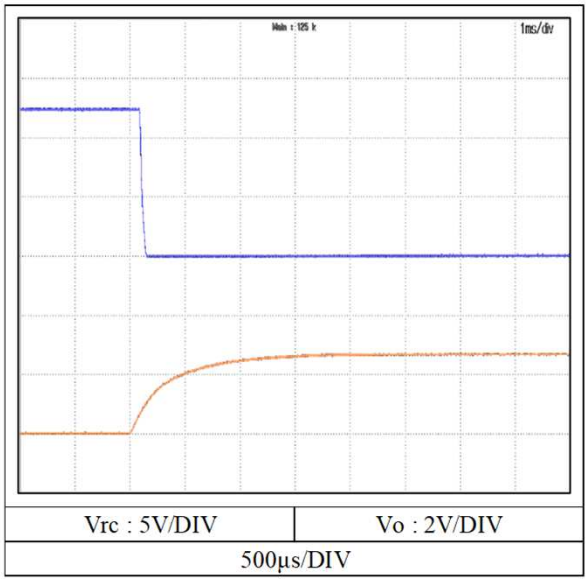


Vrc : 5V/DIV | Vo : 1V/DIV
500µs/DIV

5V



Vrc : 5V/DIV | Vo : 2V/DIV
50ms/DIV



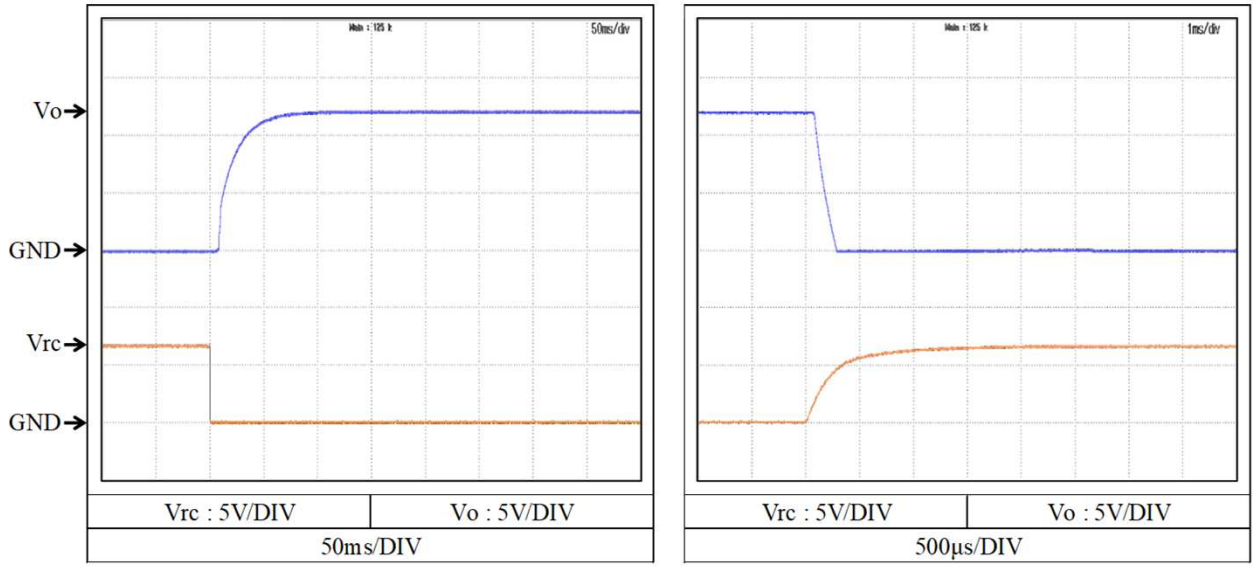
Vrc : 5V/DIV | Vo : 2V/DIV
500µs/DIV

2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

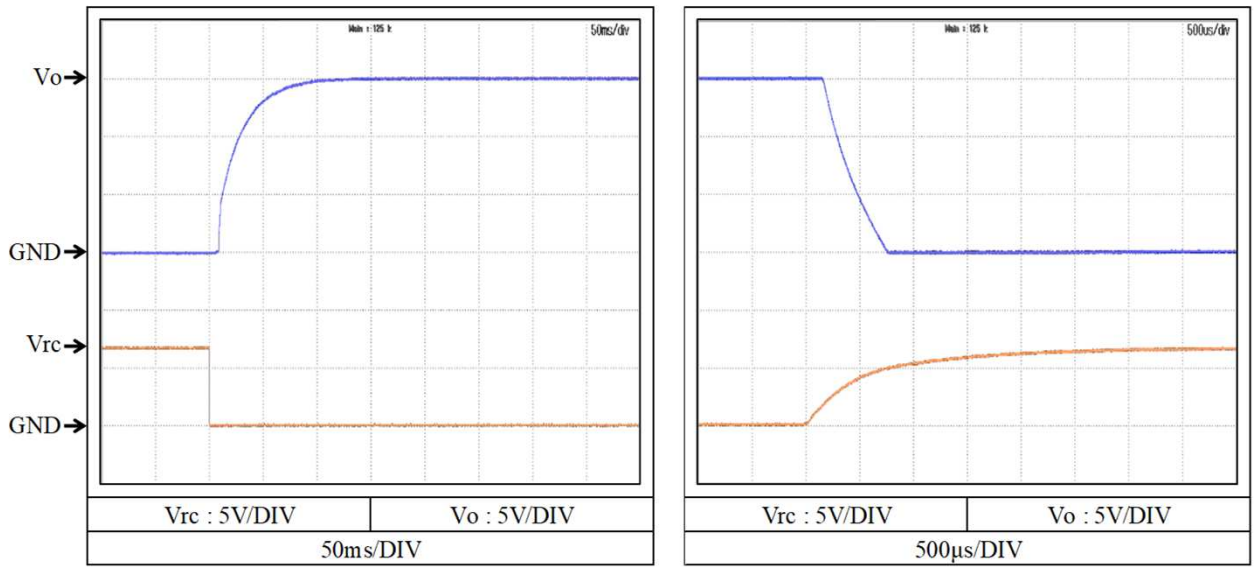
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 °C

12V



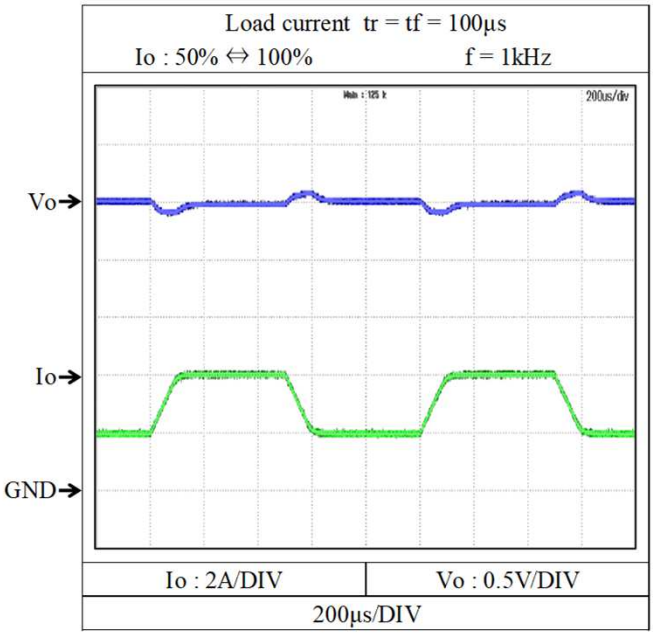
15V



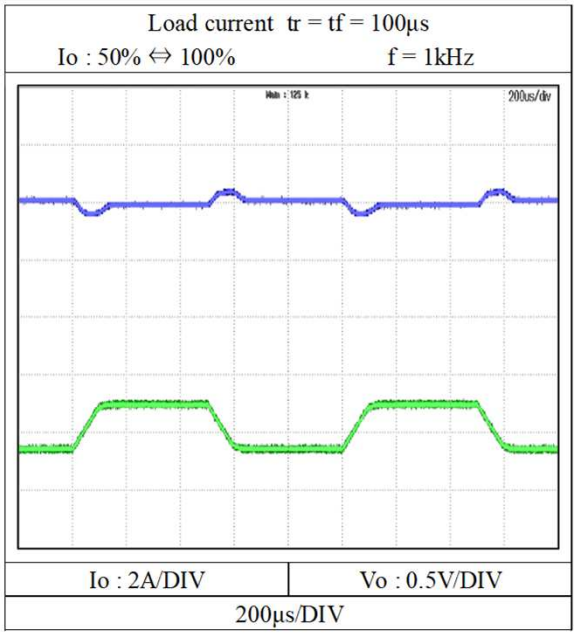
2-6. 過渡応答(負荷急変)特性 Dynamic load response characteristics

Conditions Vin : 24 VDC
Ta : 25 °C

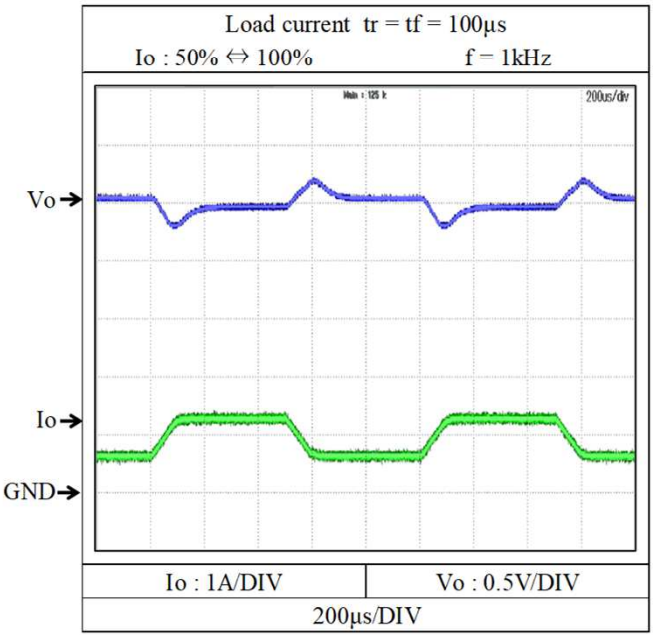
3.3V



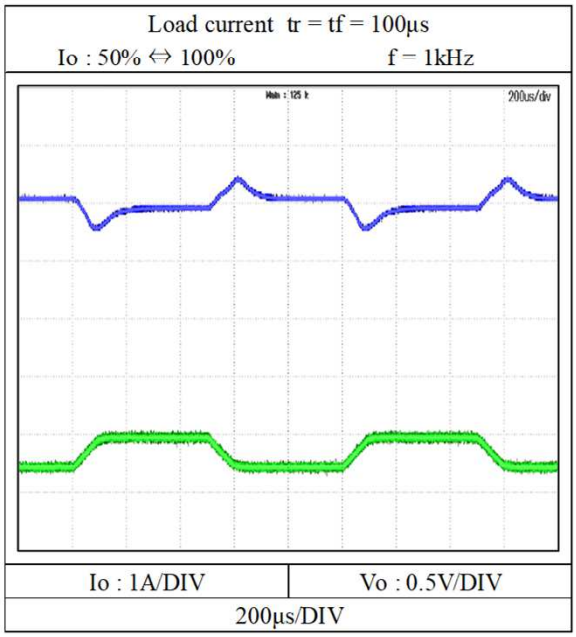
5V



12V



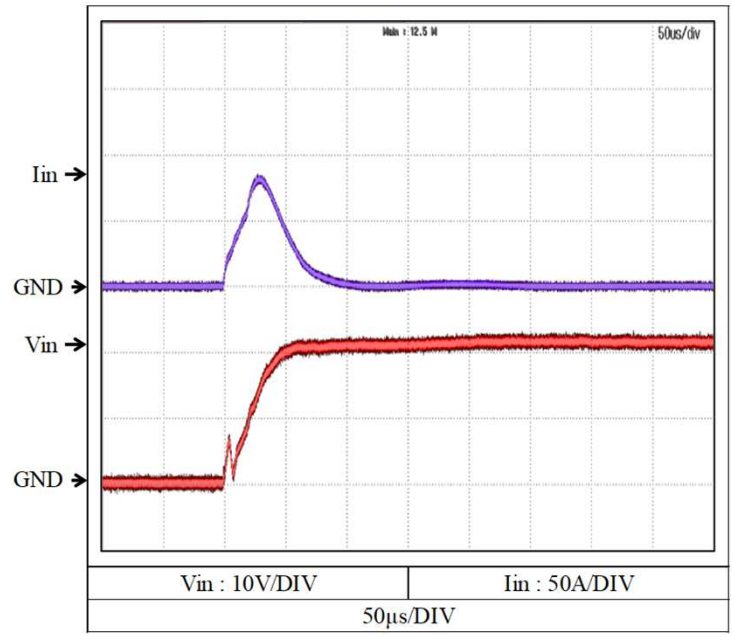
15V



2-7. 入力サージ電流(突入電流)特性 Inrush current characteristics

Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 °C

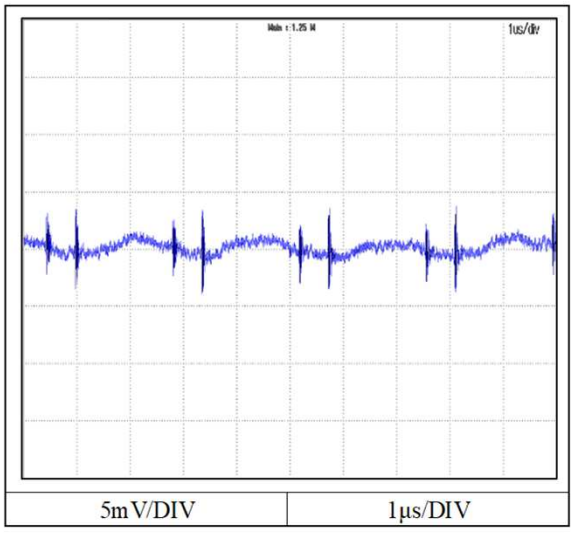
5V



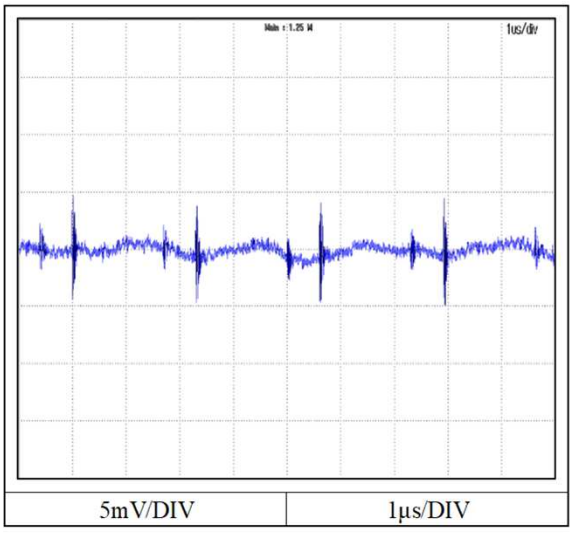
2-8. 出力リップルノイズ波形 Output ripple and noise waveform

Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 °C

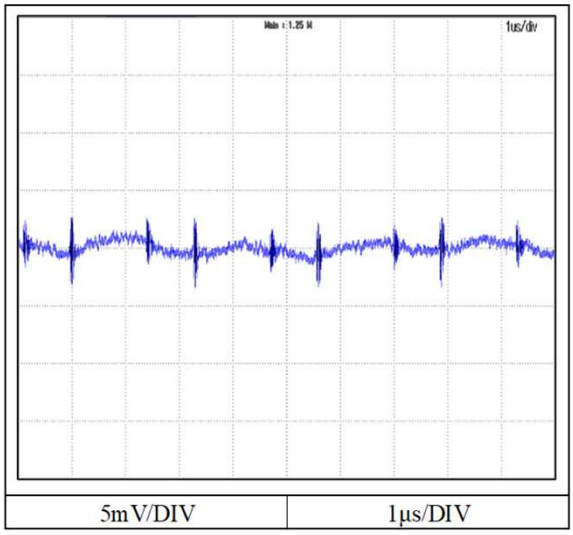
3.3V



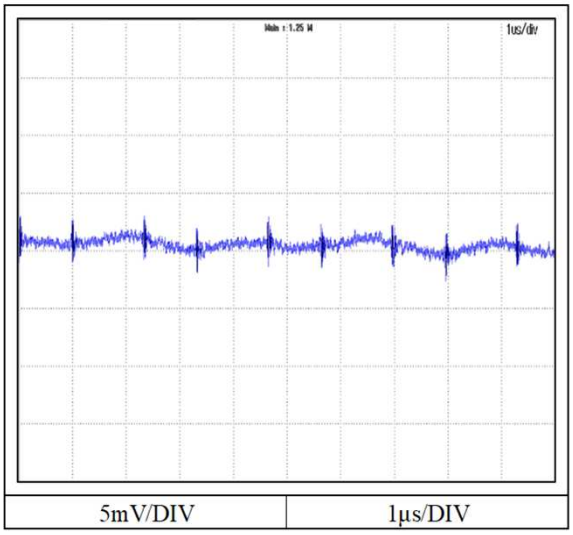
5V



12V



15V

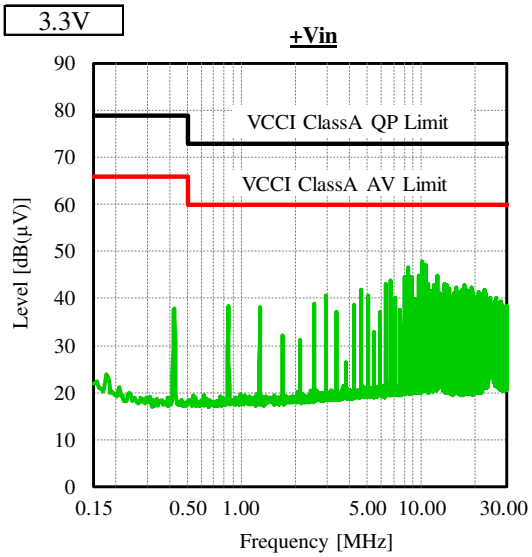


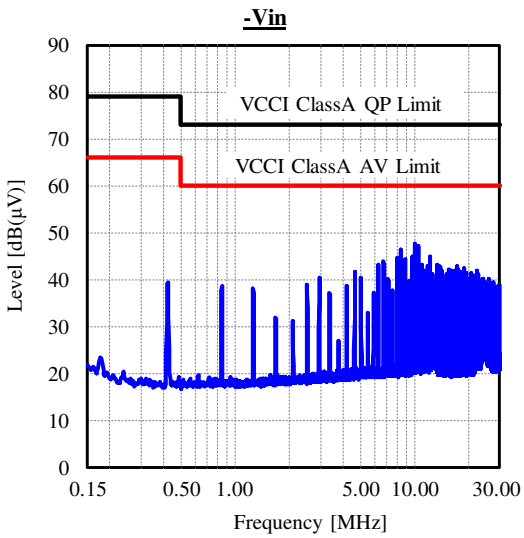
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

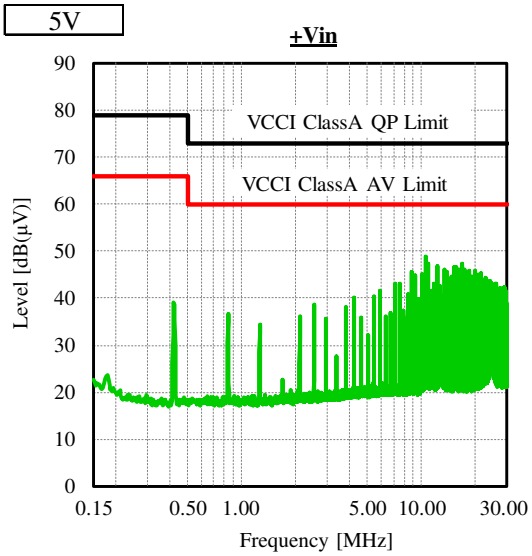
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ℃

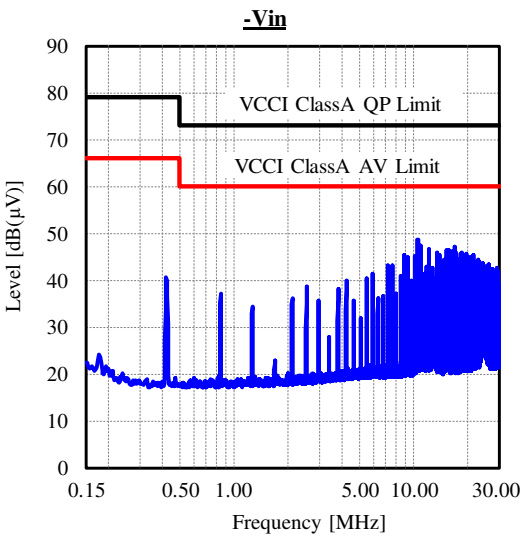
3.3V





5V





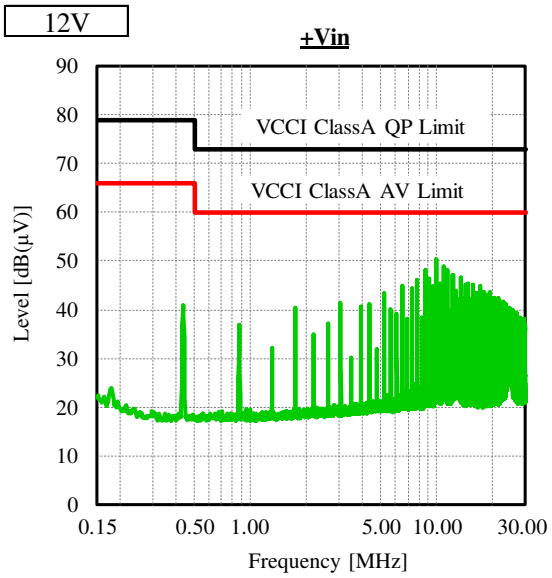
表示はQP値
Indication is QP values.

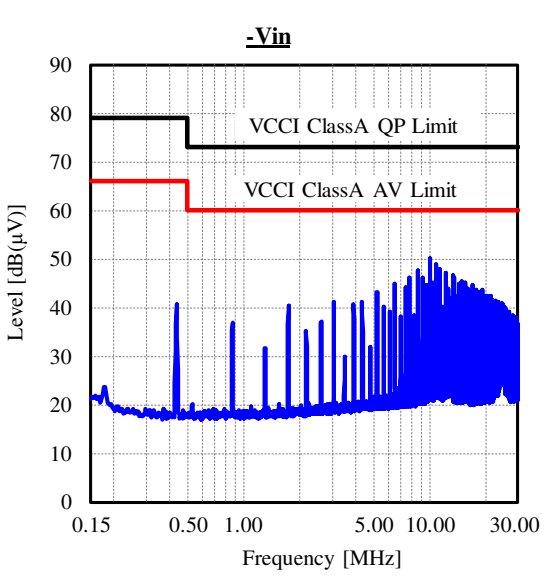
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

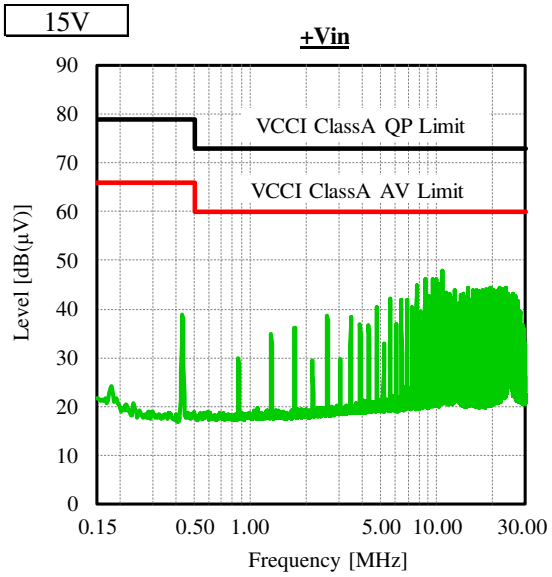
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 °C

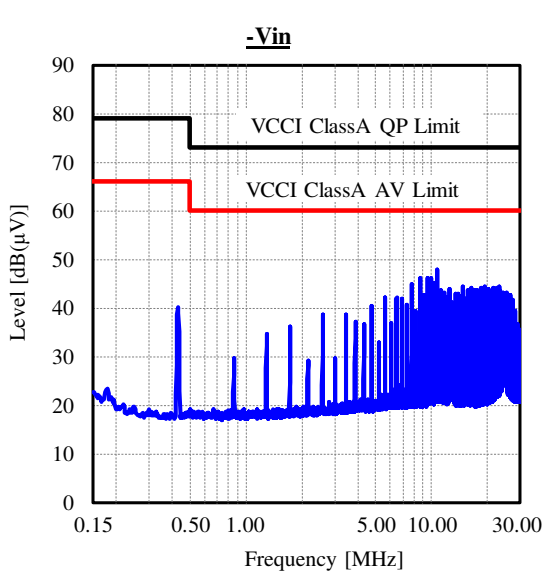
12V





15V





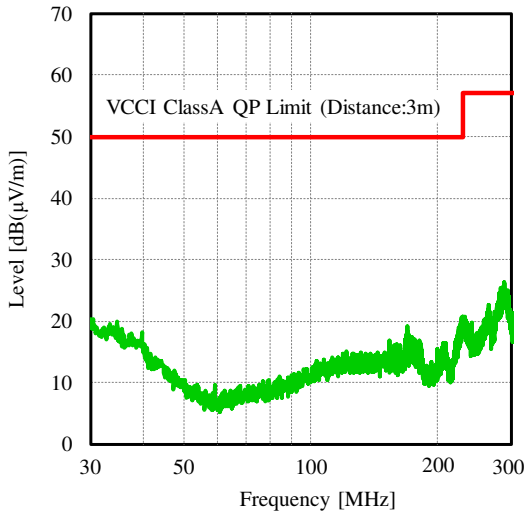
表示はQP値
Indication is QP values.

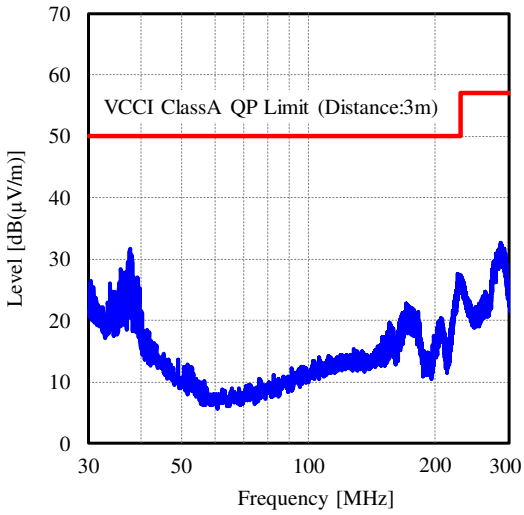
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

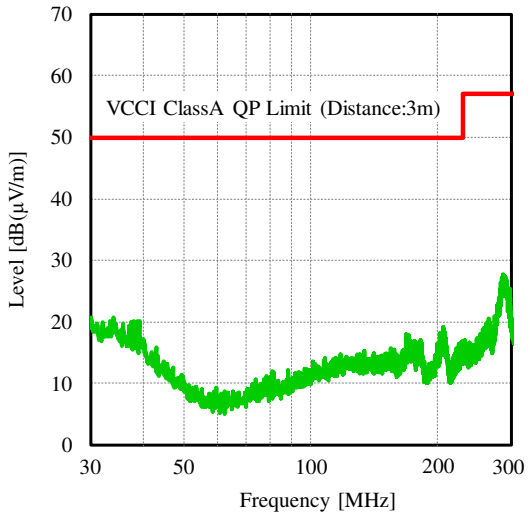
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 °C

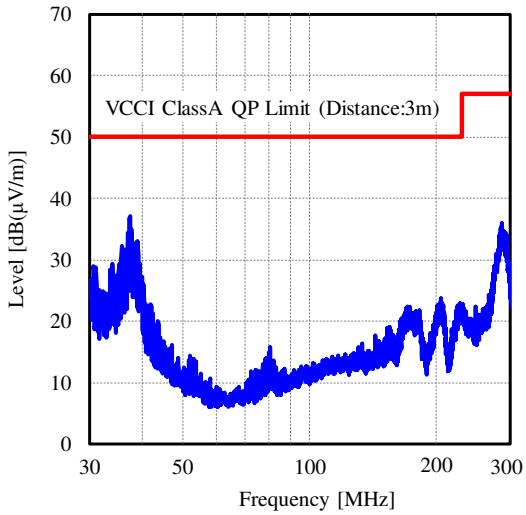
3.3V





5V





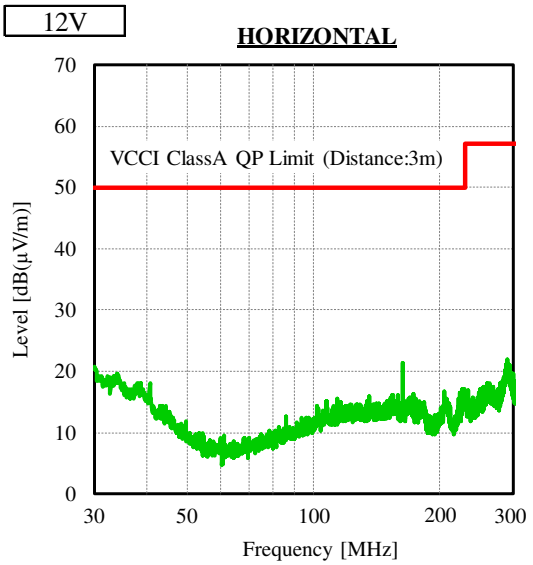
表示はピーク値
Indication is peak values.

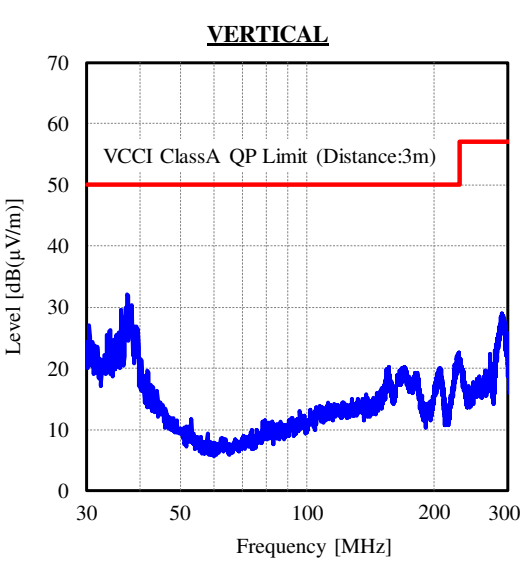
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

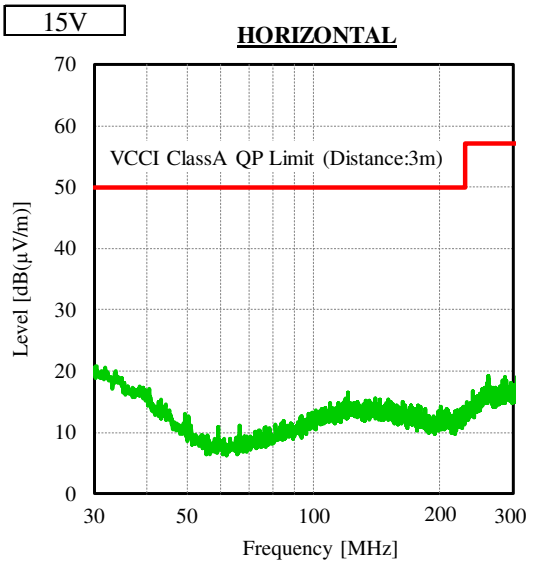
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ℃

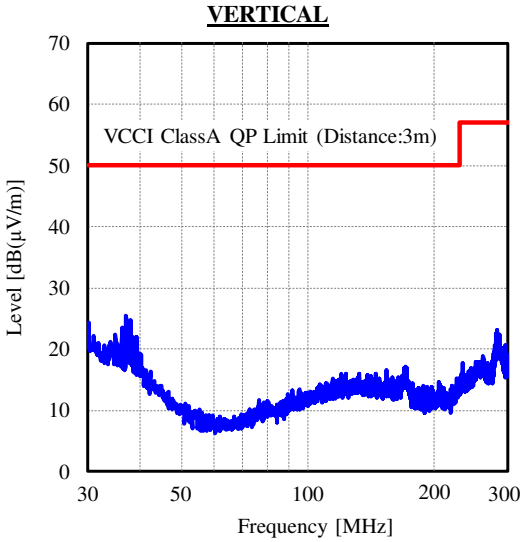
12V





15V





表示はピーク値
Indication is peak values.