CCG1R5-24-xxD

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, -Vo	・・・・・	出力電圧	Output voltage
V_{RC}	・・・・・	RC電圧	RC voltage
Iin	・・・・・	入力電流	Input current
+Io, -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。

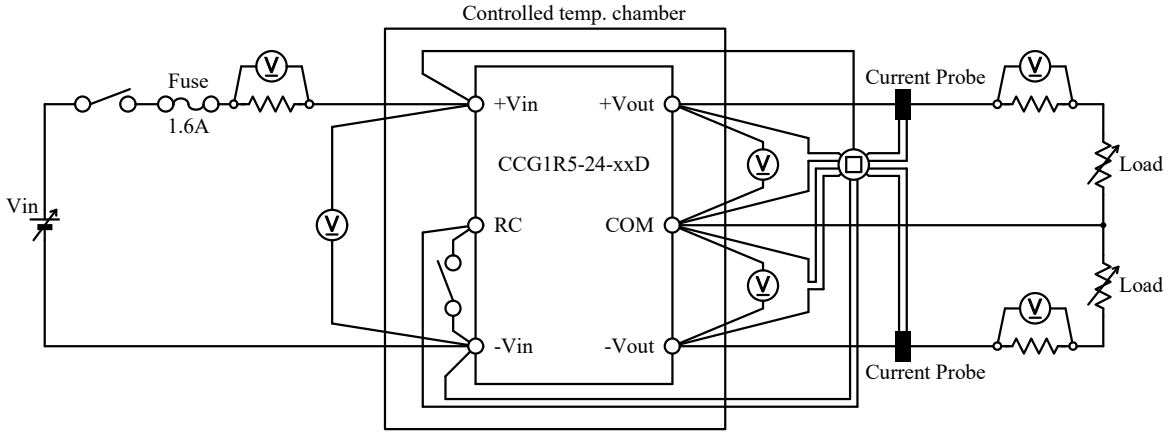
Test results are reference data based on our measurement condition.

1. 測定方法 Evaluation Method

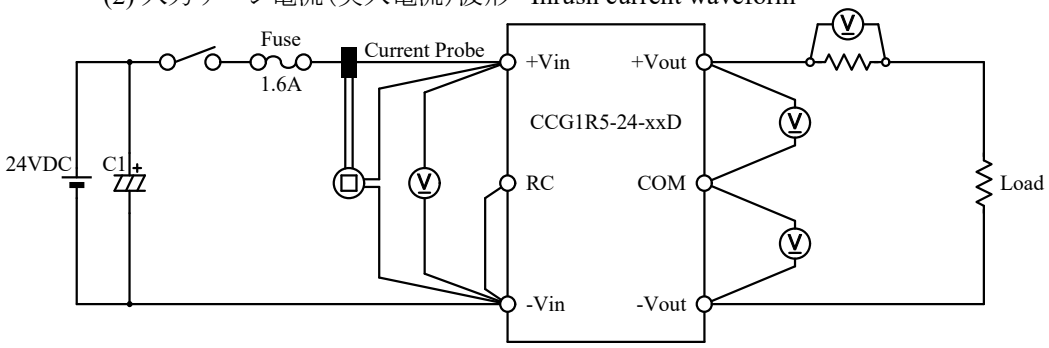
1-1. 測定回路 Measurement Circuits

(1) 静特性 、待機電力特性、通電ドリフト特性、その他特性

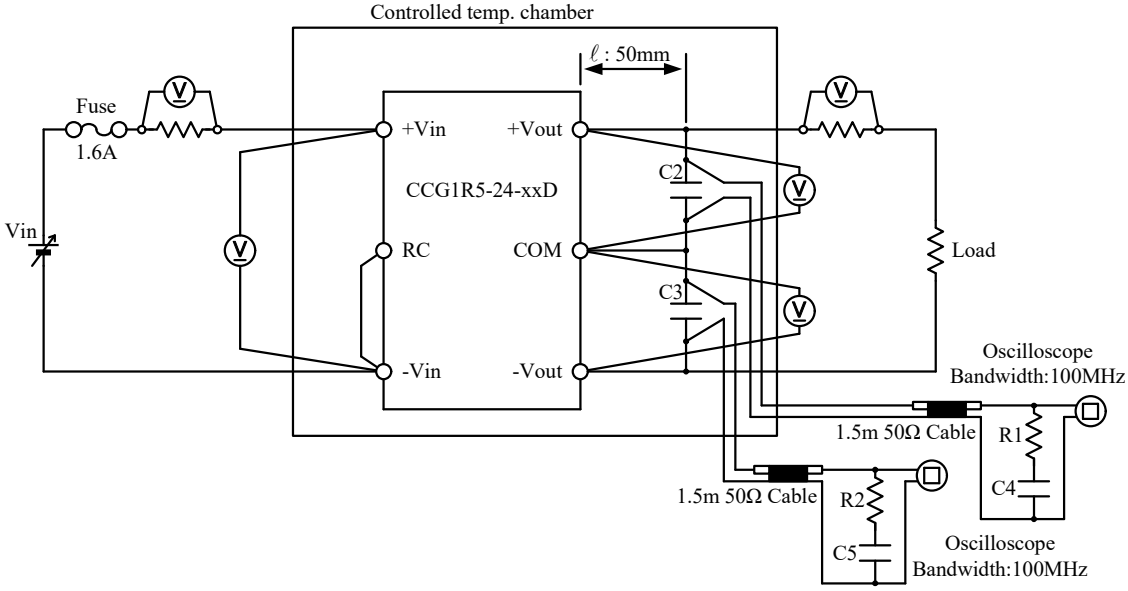
Steady state, Standby power, Warm up voltage drift and Other characteristics



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



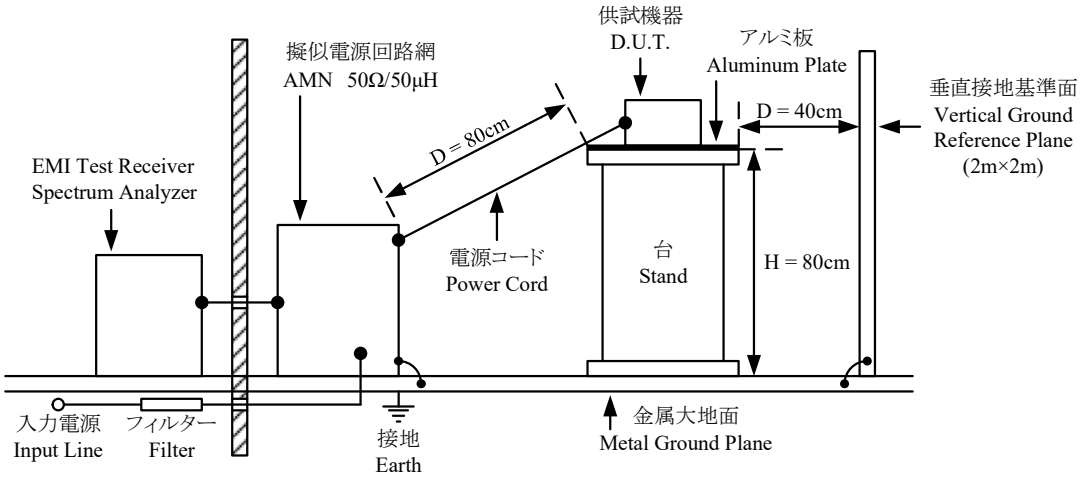
(3) 出力リップルノイズ電圧、波形 Output ripple and noise voltage and waveform



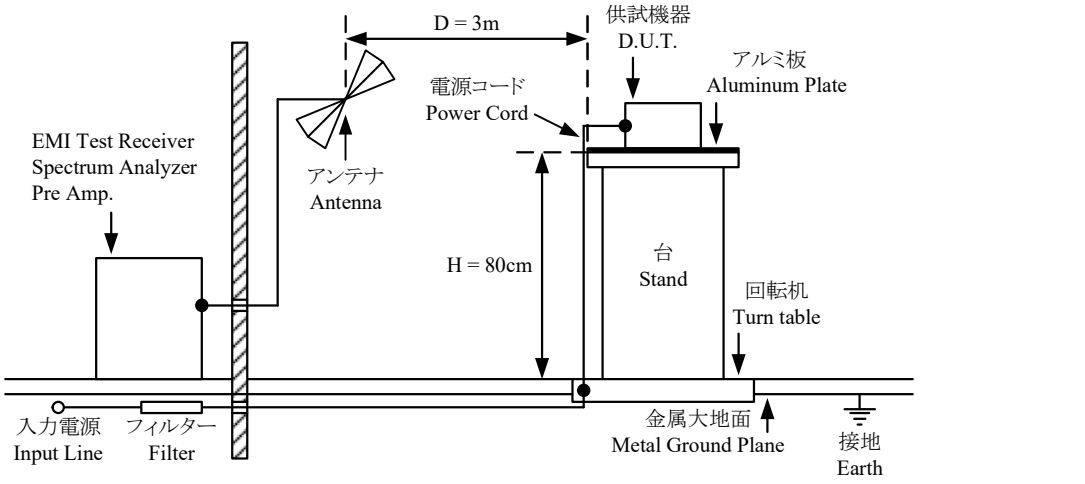
C1	: 4000μF	Electrolytic Capacitor
C2, C3	: 1μF	Ceramic Capacitor
C4, C5	: 4700pF	Ceramic Capacitor
R1, R2	: 50Ω	

(4) EMI特性　Electro-Magnetic Interference characteristics

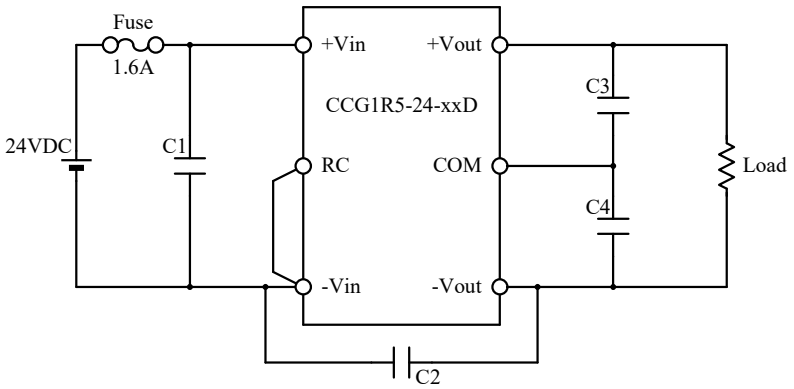
(a) 雑音端子電圧(帰還ノイズ) Conducted Emission Noise



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



VCCI class A 対応アプリケーション　VCCI class A application system



C1 : 50V 10μF Ceramic Capacitor (C3216X7R1H106K, TDK)
C2 : 2kV 1000pF Ceramic Capacitor (C4520X7R3D102K, TDK)
C3 : 25V 10μF Ceramic Capacitor (C3216X7R1E106K, TDK)
C4 : 25V 10μF Ceramic Capacitor (C3216X7R1E106K, TDK)

1-2. 使用測定機器 List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DL1740E / DL1740EL
2	DIGITAL MULTIMETER	AGILENT	34970A
3	CURRENT PROBE	YOKOGAWA ELECT.	701932
4	CURRENT PROBE	AGILENT	N2774A
5	SHUNT RESISTER	YOKOGAWA ELECT.	2215
6	DYNAMIC DUMMY LOAD	KIKUSUI	PLZ-164WL
7	CVCF	NF	ES10000S
8	DC POWER SUPPLY	TDK-Lambda	GEN80-9.5 / GENH80-9.5
9	DC POWER SUPPLY	TAKASAGO	EX-750H2
10	CONTROLLED TEMP. CHAMBER	ESPEC	SU-261 / SU-262
11	EMI TEST RECEIVER / SPECTRUM ANALYZER	ROHDE & SCHWARZ	ESR3
12	PRE AMP.	SONOMA	310N
13	AMN	KIKUSUI	KNW-242C
14	ANTENNA	SCHWARZBECK	BBA9106/VHA9103
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

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

・+Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	12.0260V	12.0257V	12.0251V	12.0251V	0.9mV	0.007%
50%(32.5mA)	12.0233V	12.0251V	12.0248V	12.0244V	1.8mV	0.015%
100%(65mA)	12.0161V	12.0205V	12.0252V	12.0251V	9.1mV	0.076%
Load regulation	9.9mV	5.2mV	0.4mV	0.7mV		
	0.083%	0.043%	0.003%	0.006%		

・−Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	-12.0359V	-12.0362V	-12.0369V	-12.0370V	1.1mV	0.009%
50%(32.5mA)	-12.0389V	-12.0372V	-12.0376V	-12.0383V	1.7mV	0.014%
100%(65mA)	-12.0463V	-12.0419V	-12.0377V	-12.0376V	8.7mV	0.073%
Load regulation	10.4mV	5.7mV	0.8mV	1.3mV		
	0.087%	0.048%	0.007%	0.011%		

・+Vo to −Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	24.0618V	24.0620V	24.0620V	24.0621V	0.3mV	0.001%
50%(32.5mA)	24.0622V	24.0623V	24.0624V	24.0627V	0.5mV	0.002%
100%(65mA)	24.0624V	24.0625V	24.0629V	24.0627V	0.5mV	0.002%
Load regulation	0.6mV	0.5mV	0.9mV	0.6mV		
	0.002%	0.002%	0.004%	0.002%		

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

Ta	-40°C	25°C	85°C	Temperature stability	
+Vo	11.9782V	12.0252V	12.0117V	47.0mV	0.392%
-Vo	-11.9881V	-12.0377V	-12.0258V	49.6mV	0.413%
+Vo to -Vo	23.9663V	24.0629V	24.0375V	96.6mV	0.402%

3. Load Regulation - Unbalance load Condition Ta : 25 °C

・+Vo (-Io : 100%)

+Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%(13mA)	12.0951V	12.0888V	12.0888V	12.0845V
100%(65mA)	12.0160V	12.0203V	12.0203V	12.0250V
Load regulation	79.1mV	68.5mV	68.5mV	59.5mV
	0.659%	0.571%	0.571%	0.496%

・−Vo (+Io : 100%)

-Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%(13mA)	-12.1166V	-12.1070V	-12.1070V	-12.1043V
100%(65mA)	-12.0469V	-12.0424V	-12.0424V	-12.0382V
Load regulation	69.7mV	64.6mV	64.6mV	66.1mV
	0.581%	0.538%	0.538%	0.551%

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

・+Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	14.9306V	14.9299V	14.9307V	14.9317V	1.8mV	0.012%
50%(25mA)	14.9294V	14.9302V	14.9261V	14.9242V	6.0mV	0.040%
100%(50mA)	14.9232V	14.9257V	14.9274V	14.9248V	4.2mV	0.028%
Load	7.4mV	4.5mV	4.6mV	7.5mV		
regulation	0.049%	0.030%	0.031%	0.050%		

・−Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	-14.9461V	-14.9465V	-14.9458V	-14.9449V	1.6mV	0.011%
50%(25mA)	-14.9476V	-14.9471V	-14.9504V	-14.9524V	5.3mV	0.035%
100%(50mA)	-14.9538V	-14.9512V	-14.9491V	-14.9520V	4.7mV	0.031%
Load	7.7mV	4.7mV	4.6mV	7.5mV		
regulation	0.051%	0.031%	0.031%	0.050%		

・+Vo to −Vo

Io \ Vin	9VDC	12VDC	24VDC	36VDC	Line regulation	
0%	29.8767V	29.8765V	29.8765V	29.8767V	0.2mV	0.001%
50%(25mA)	29.8770V	29.8773V	29.8766V	29.8766V	0.7mV	0.002%
100%(50mA)	29.8770V	29.8769V	29.8766V	29.8768V	0.4mV	0.001%
Load	0.3mV	0.8mV	0.1mV	0.2mV		
regulation	0.001%	0.003%	0.000%	0.001%		

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

Ta	-40°C	25°C	85°C	Temperature stability	
+Vo	14.9097V	14.9274V	14.8806V	46.8mV	0.312%
-Vo	-14.9256V	-14.9491V	-14.9048V	44.3mV	0.295%
+Vo to -Vo	29.8353V	29.8766V	29.7854V	91.2mV	0.304%

3. Load Regulation - Unbalance load Condition Ta : 25 °C

・+Vo (-Io : 100%)

+Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%(10mA)	15.0288V	15.0164V	15.0164V	15.0041V
100%(50mA)	14.9225V	14.9253V	14.9253V	14.9245V
Load	106.3mV	91.1mV	91.1mV	79.6mV
regulation	0.709%	0.607%	0.607%	0.531%

・−Vo (+Io : 100%)

-Io \ Vin	9VDC	12VDC	24VDC	36VDC
20%(10mA)	-15.0512V	-15.0381V	-15.0381V	-15.0389V
100%(50mA)	-14.9539V	-14.9514V	-14.9514V	-14.9521V
Load	97.3mV	86.7mV	86.7mV	86.8mV
regulation	0.649%	0.578%	0.578%	0.579%

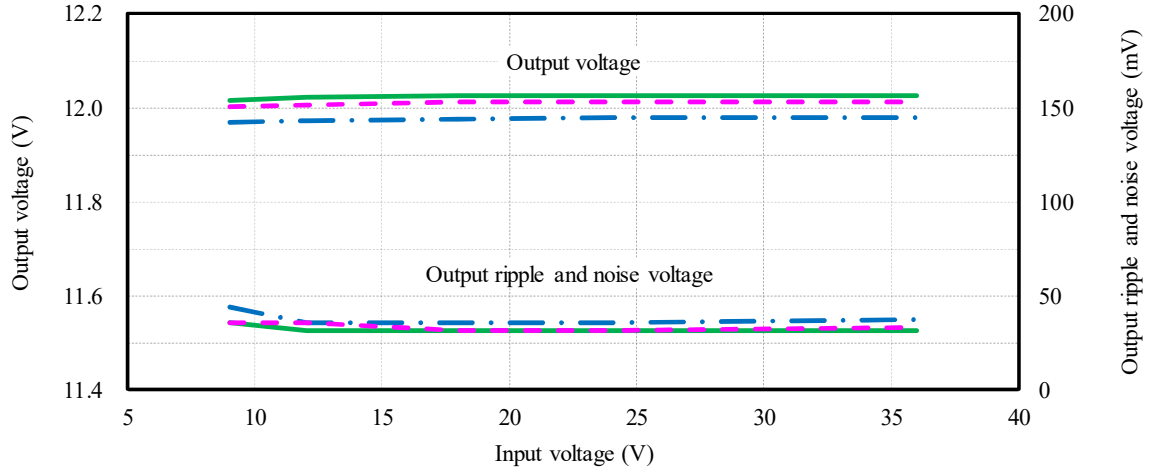
(2) 出力電圧・出力リップルノイズ電圧 対 入力電圧

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

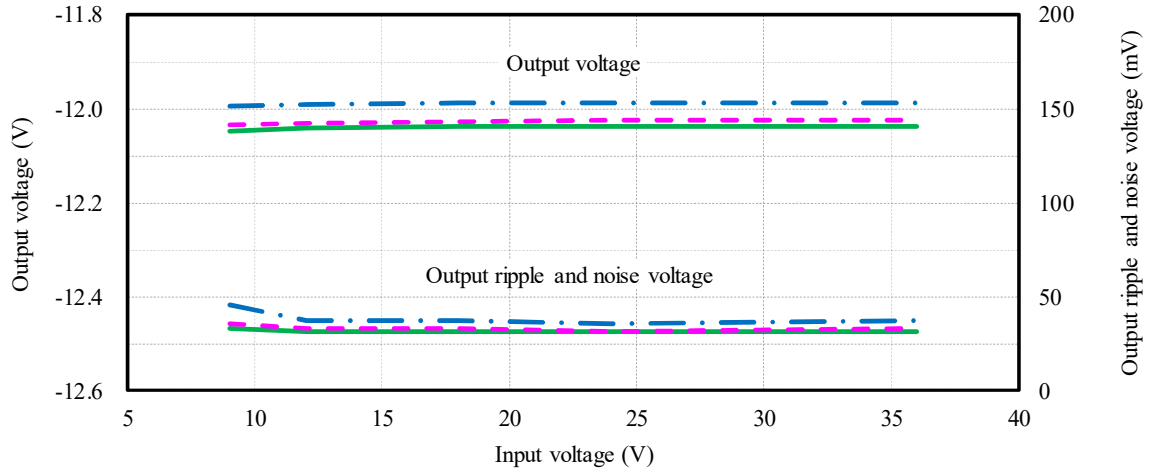
Conditions Io : 100 %
Ta : -40 °C
: 25 °C
: 85 °C

±12V

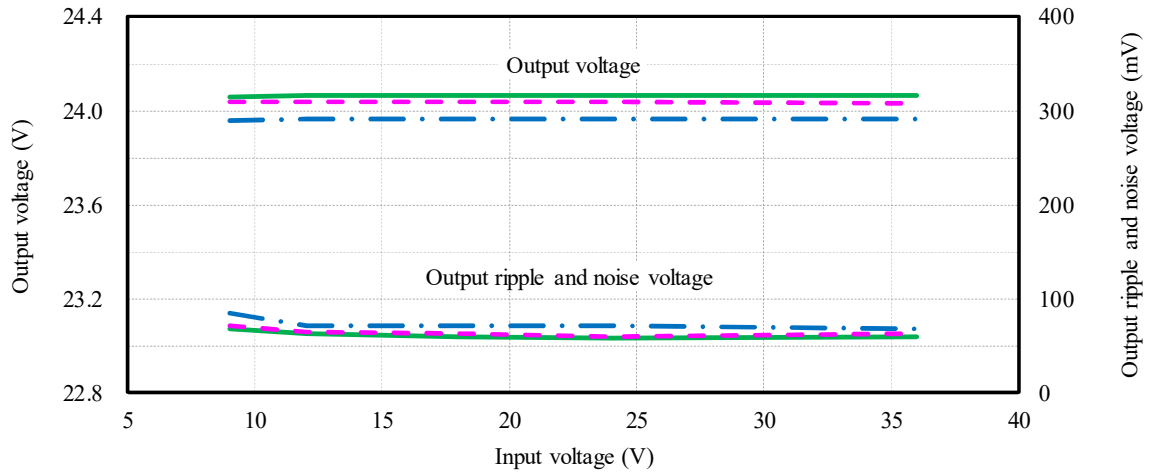
・+Vo



・−Vo



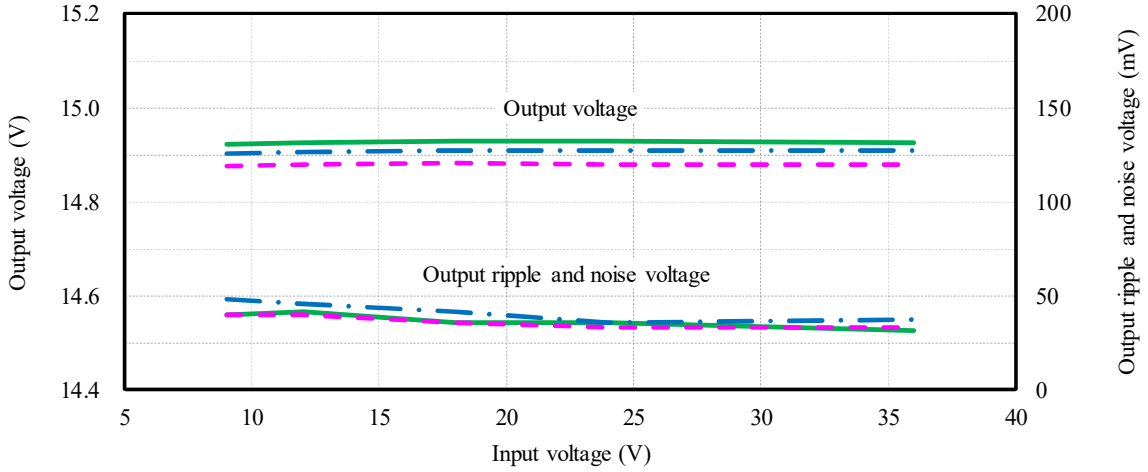
・+Vo to -Vo



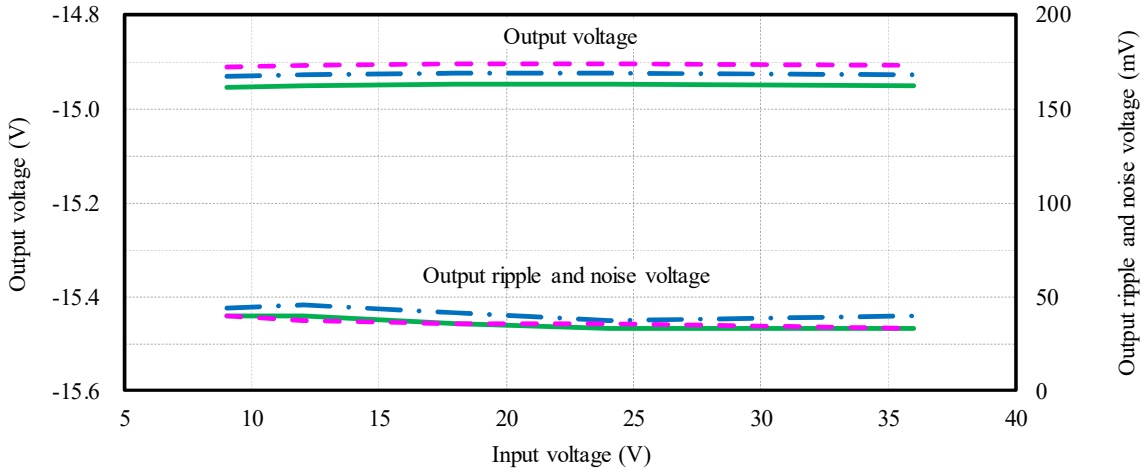
Conditions Io : 100 %
Ta : -40 °C
: 25 °C
: 85 °C

±15V

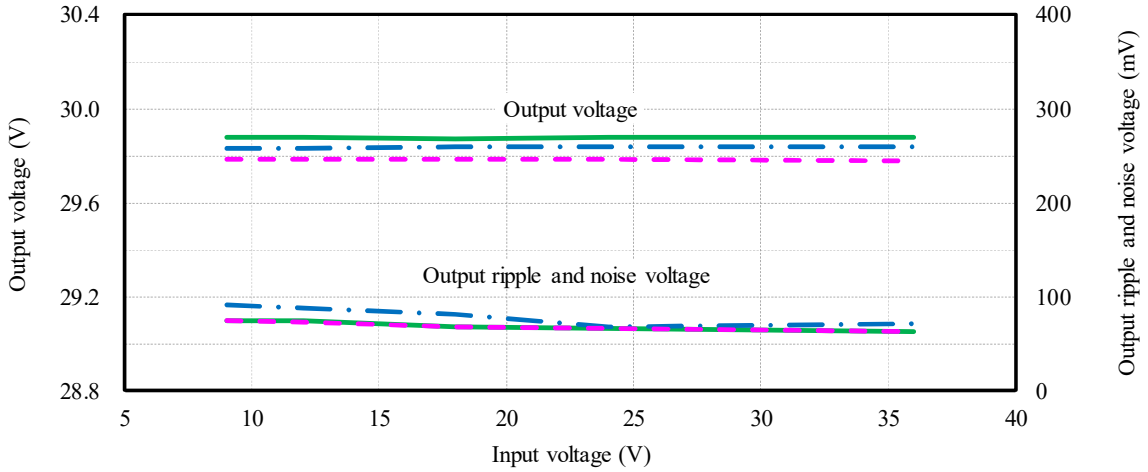
・+Vo



・−Vo



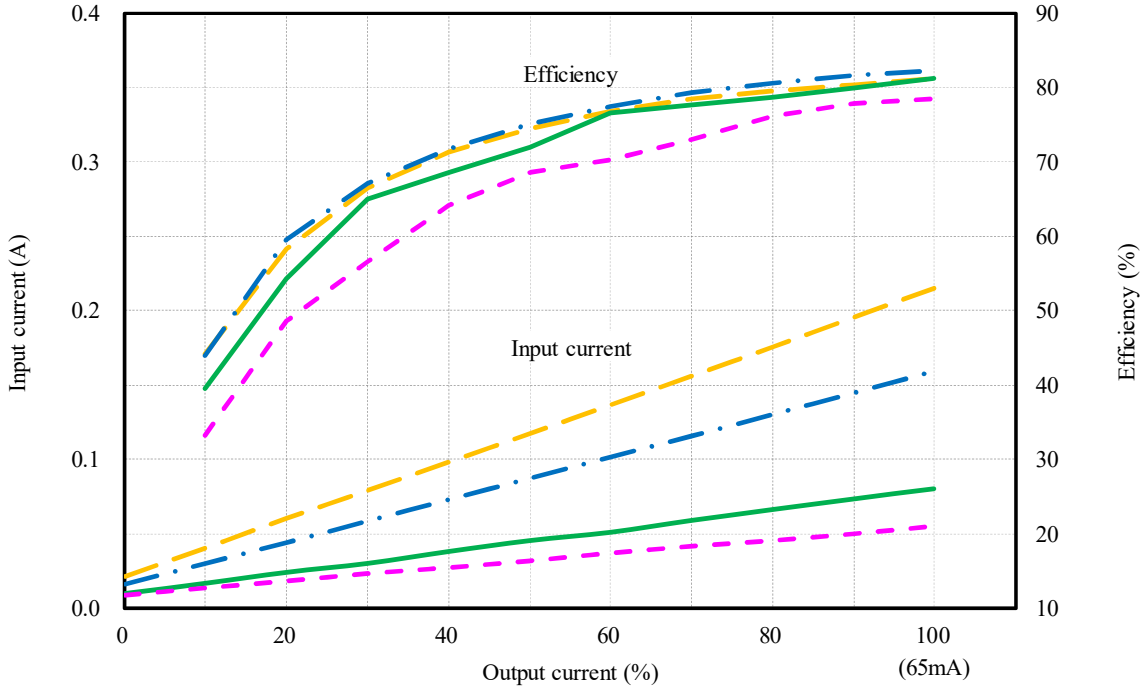
・+Vo to -Vo



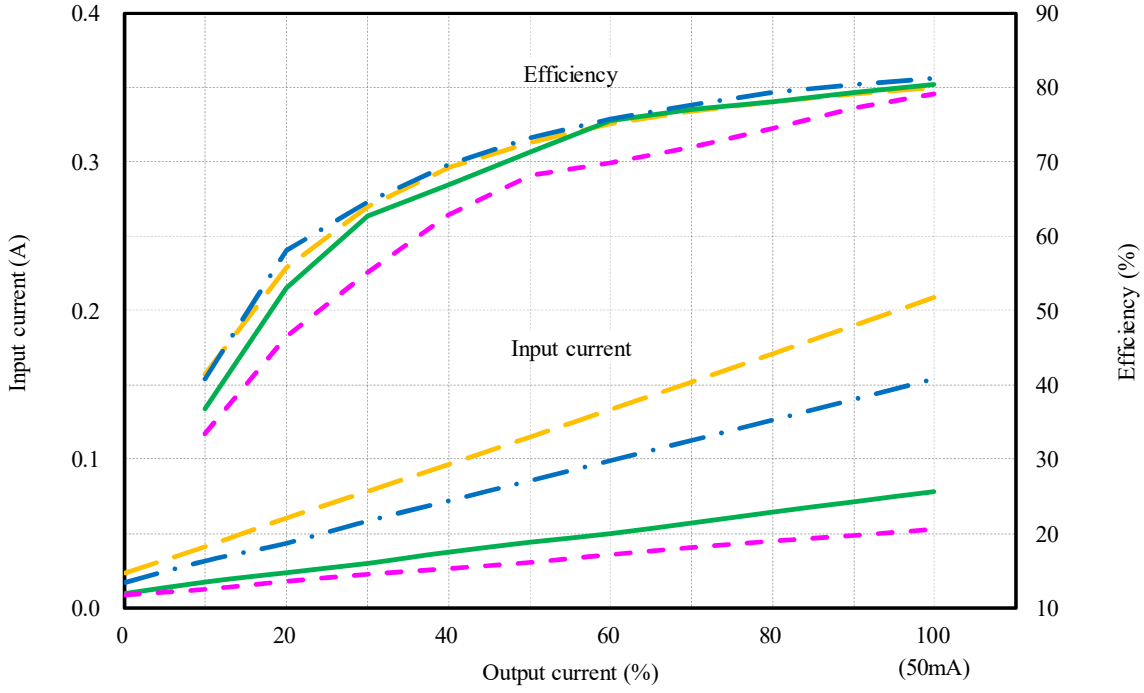
(3) 入力電流･効率 対 出力電流 Input current and Efficiency vs. Output current

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

±12V



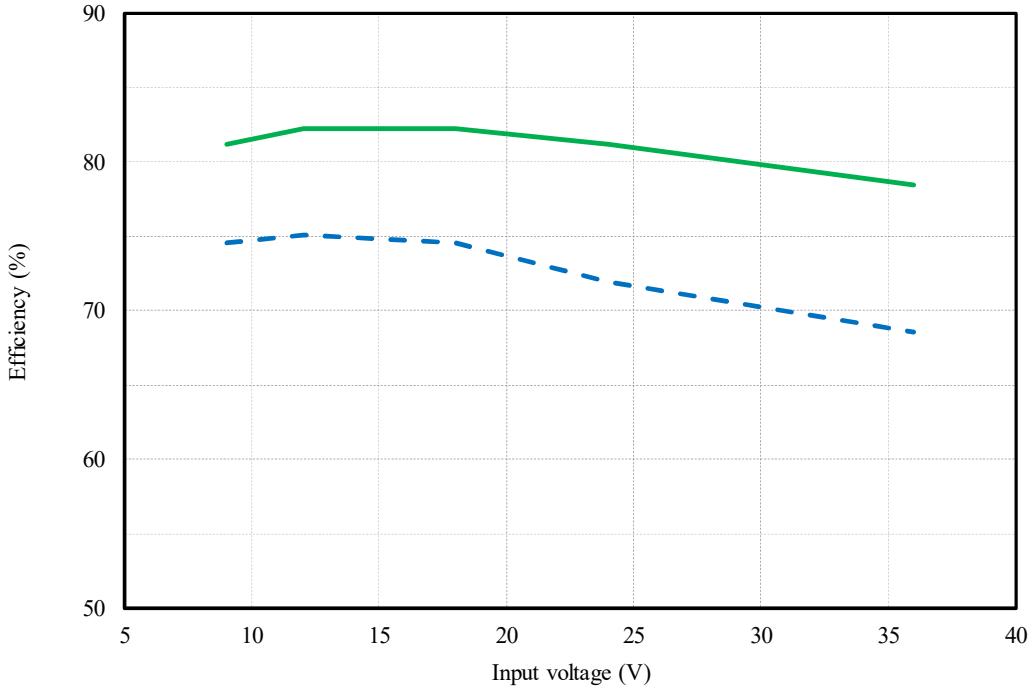
±15V



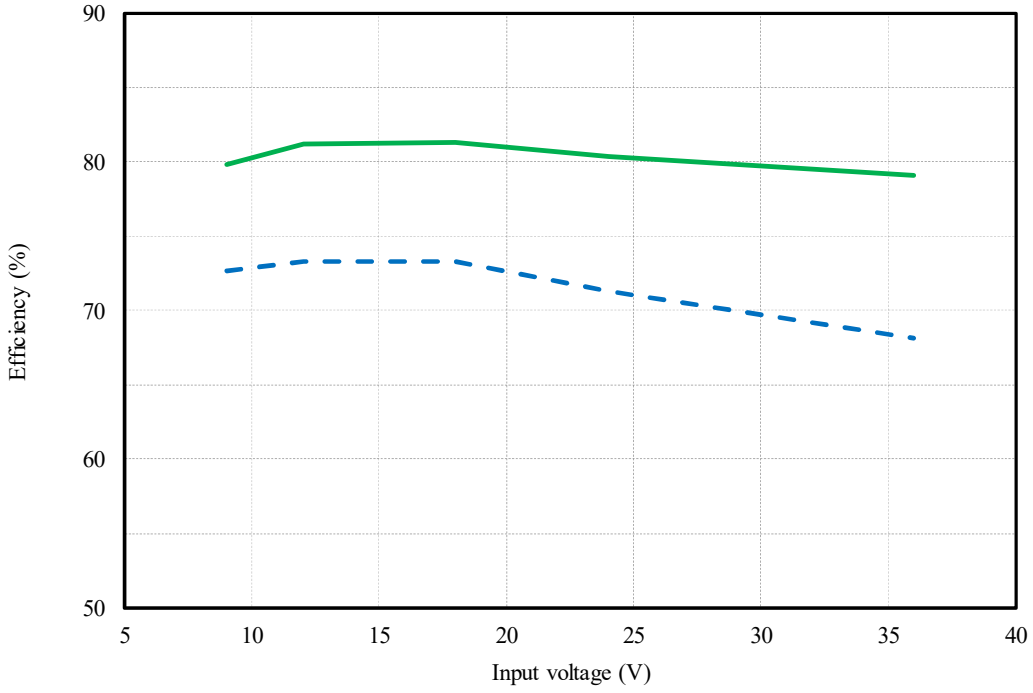
(4) 効率 対 入力電圧 Efficiency vs. Input voltage

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

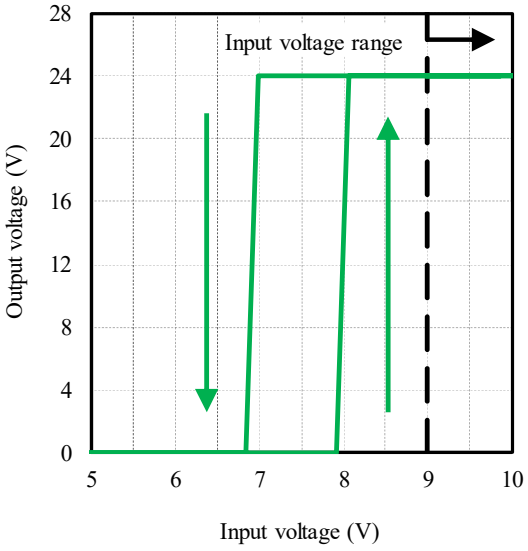
出力電圧 対 入力電圧
Output voltage vs. Input voltage

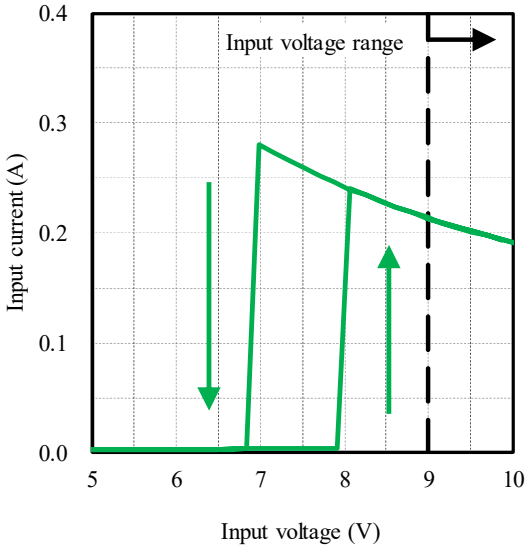
Conditions Io : 100 %
Ta : 25 °C

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

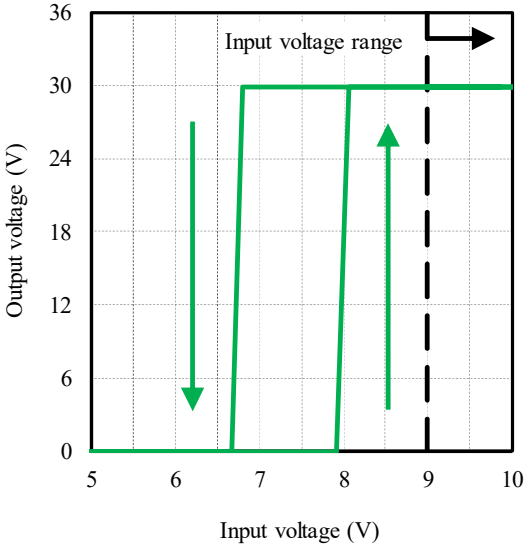
Conditions Io : 100 %
Ta : 25 °C

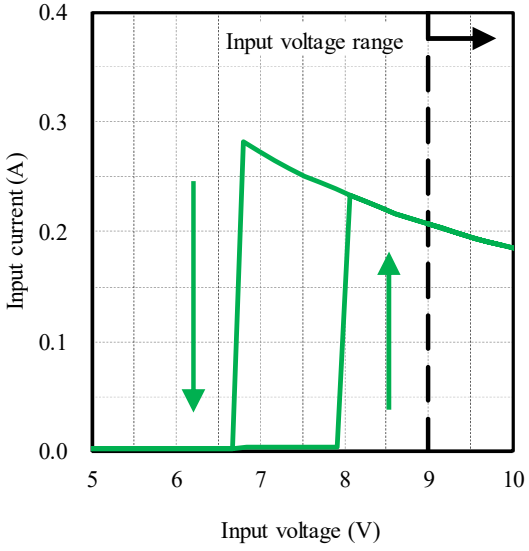
±12V





±15V

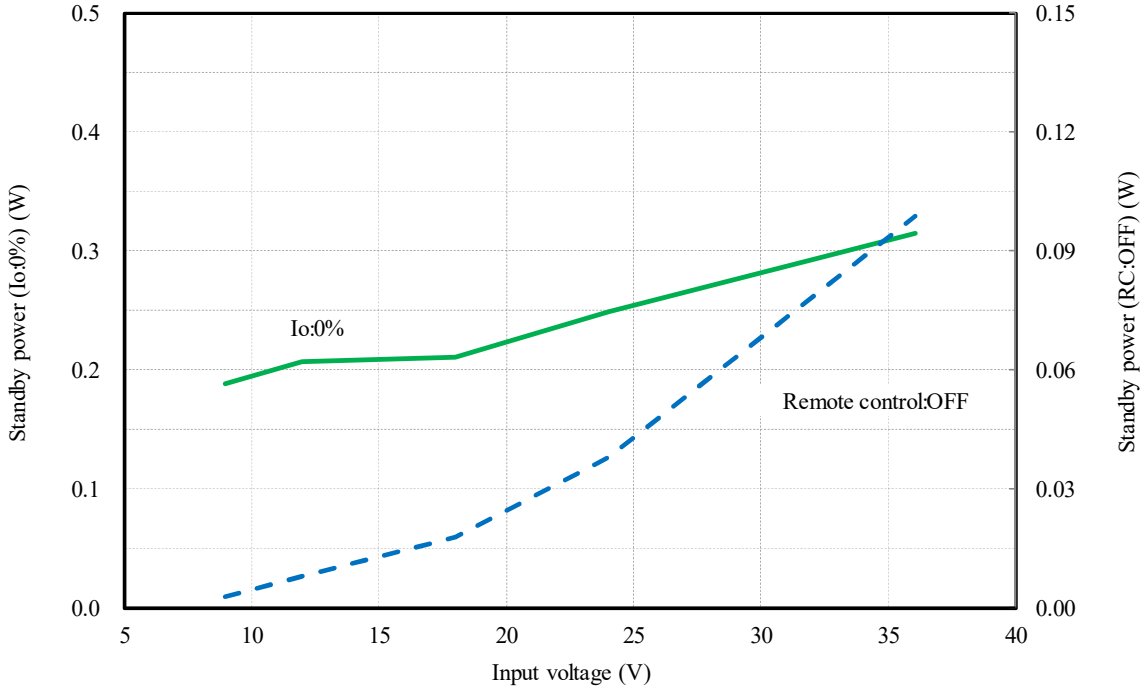




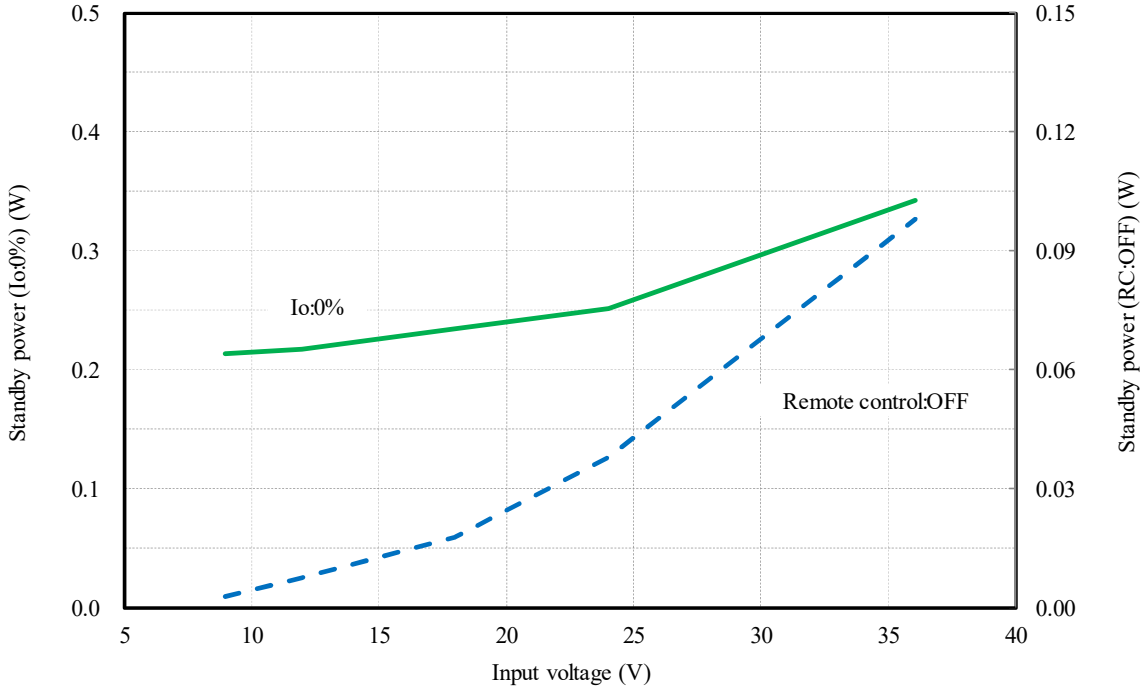
2-2. 待機電力特性 Standby power characteristics

Condition Ta : 25 °C

±12V



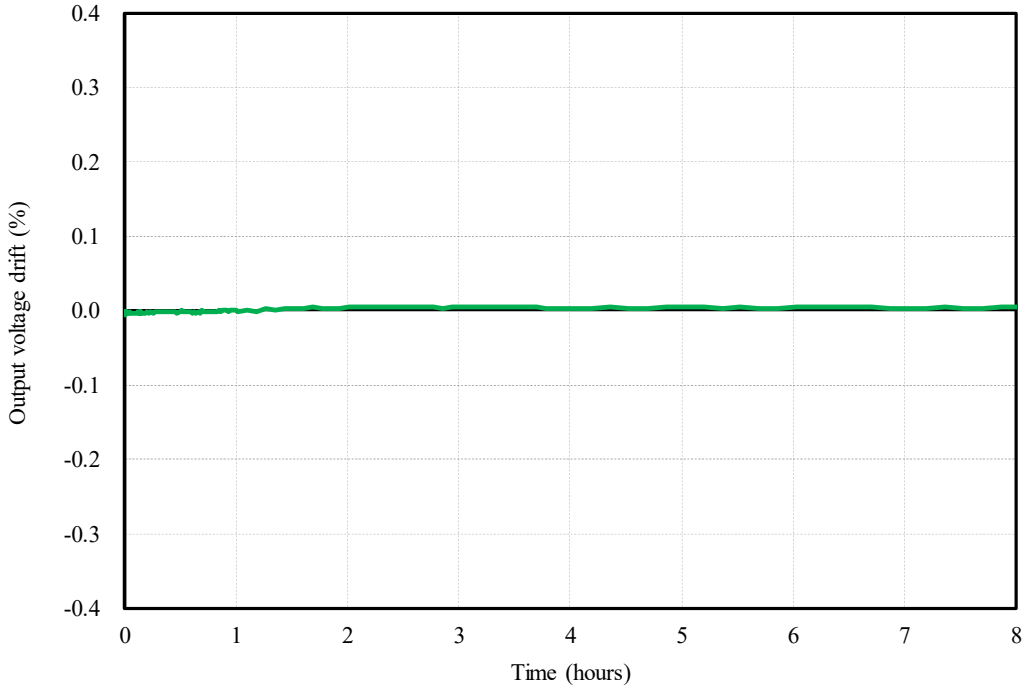
±15V



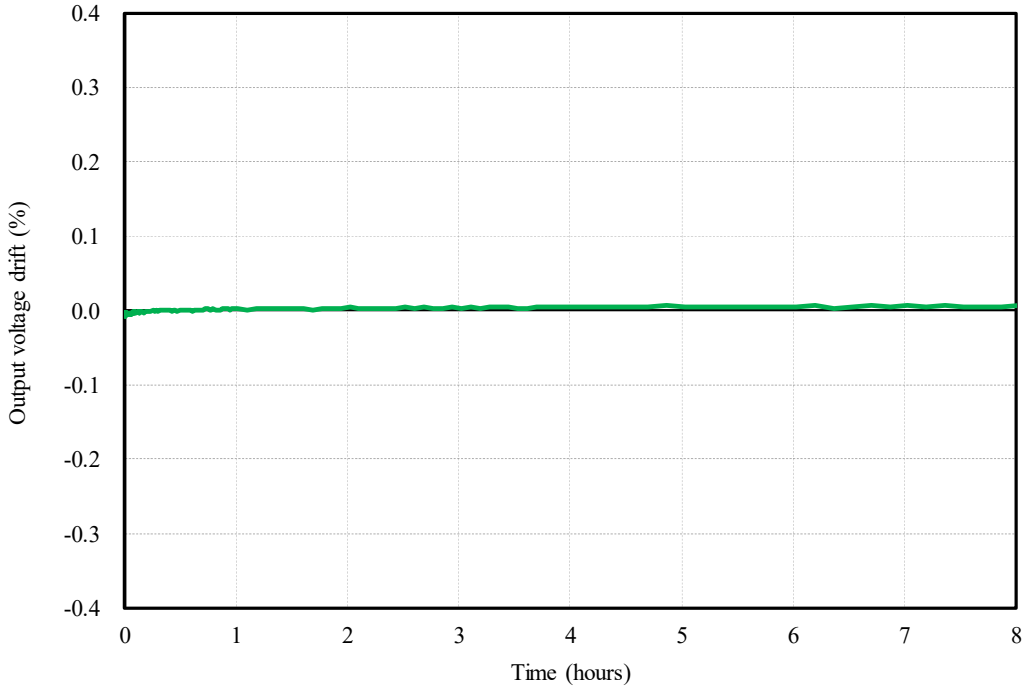
2-3. 通電ドリフト特性 Warm up voltage drift characteristics

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

±12V



±15V



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

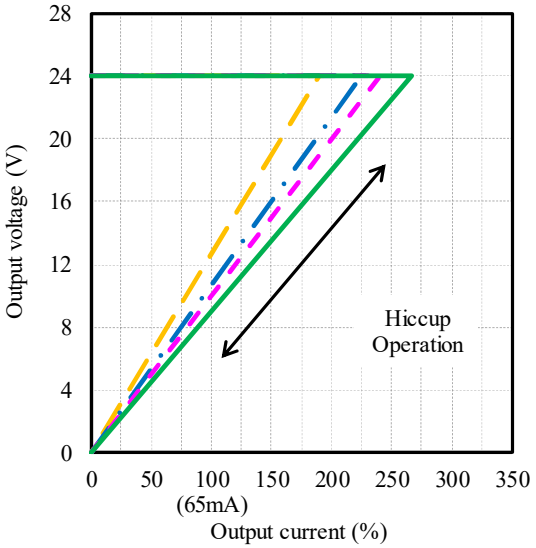
入力電圧依存性
Input voltage dependence

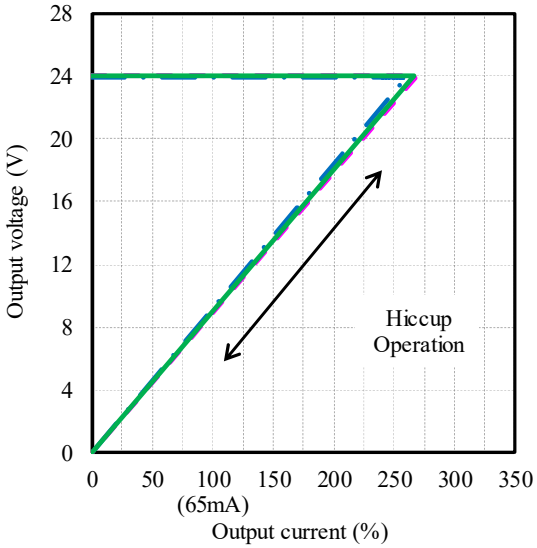
Conditions Vin : 9 VDC
: 12 VDC
: 24 VDC
: 36 VDC
Ta : 25 °C

周囲温度依存性
Ambient temperature dependence

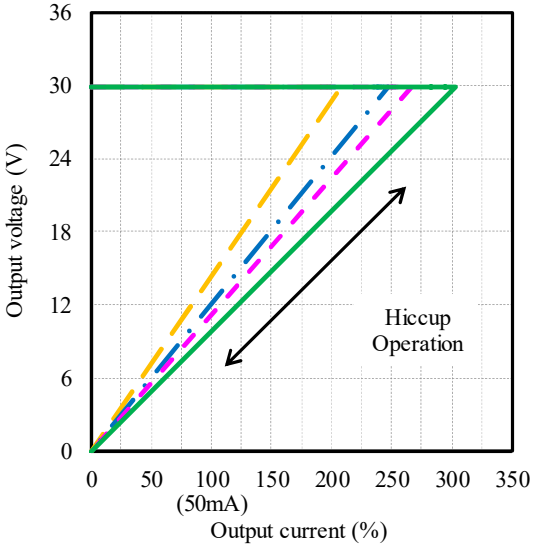
Conditions Vin : 24 VDC
Ta : -40 °C
: 25 °C
: 85 °C

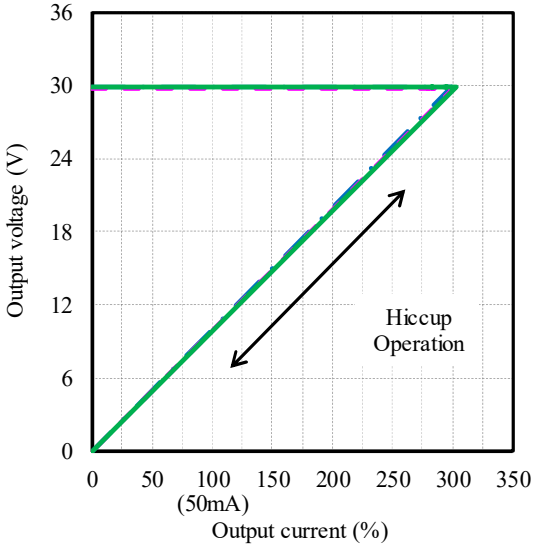
±12V





±15V

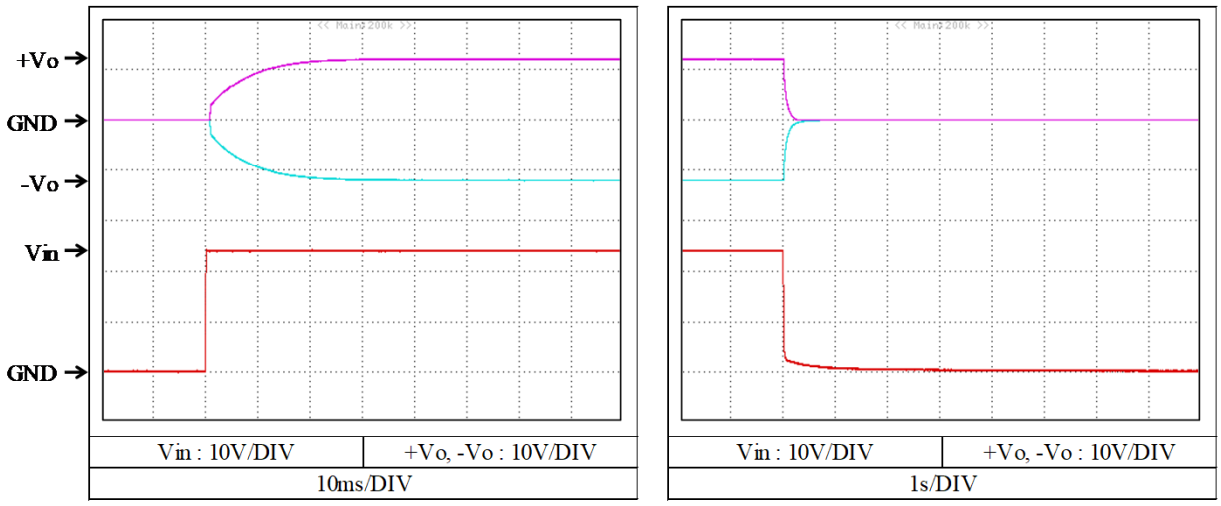




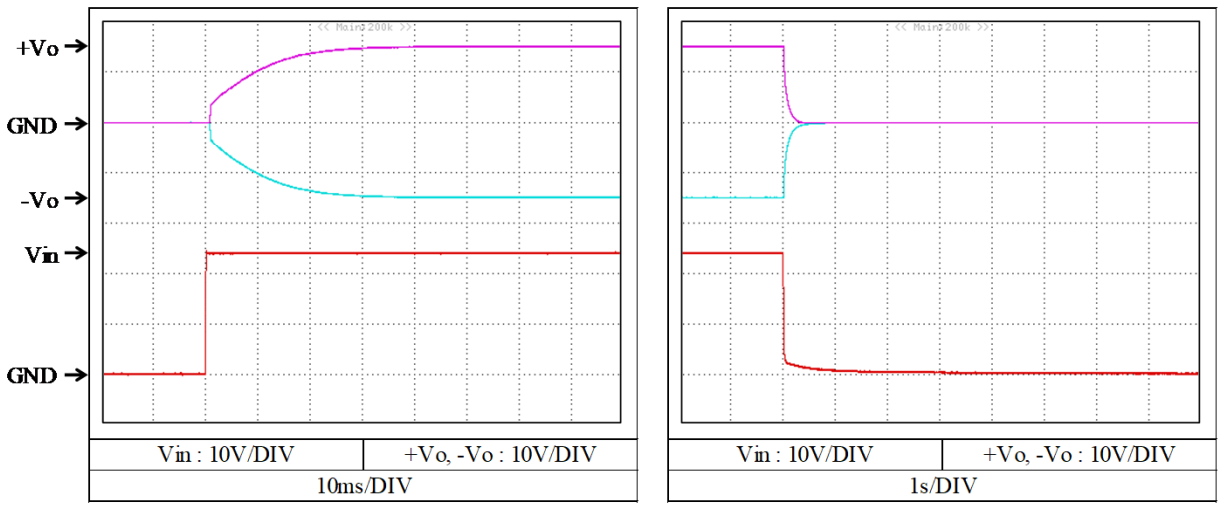
2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

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

±12V



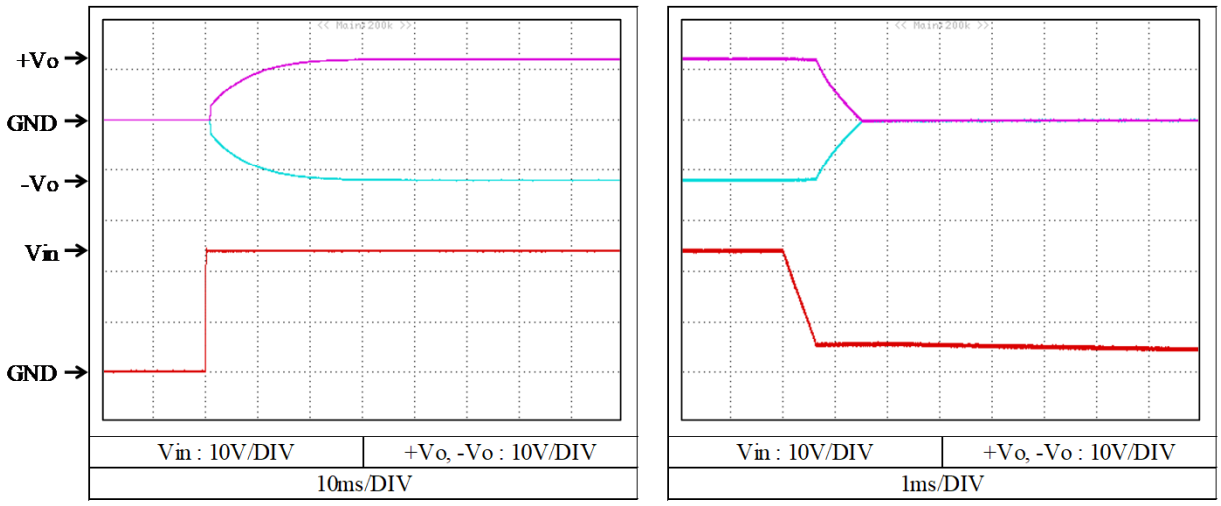
+15V



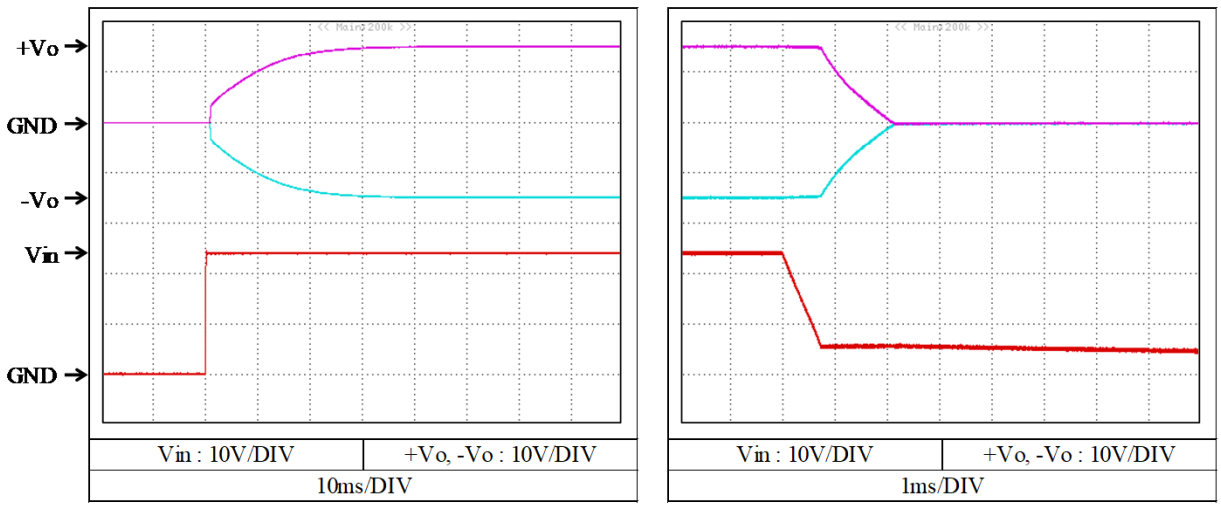
2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

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

±12V



+15V

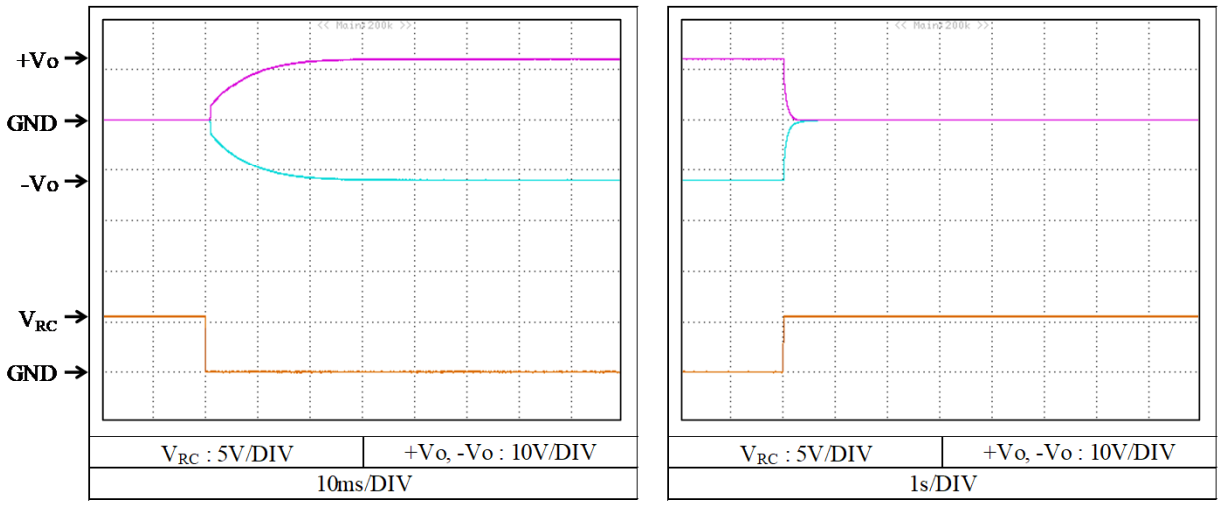


2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

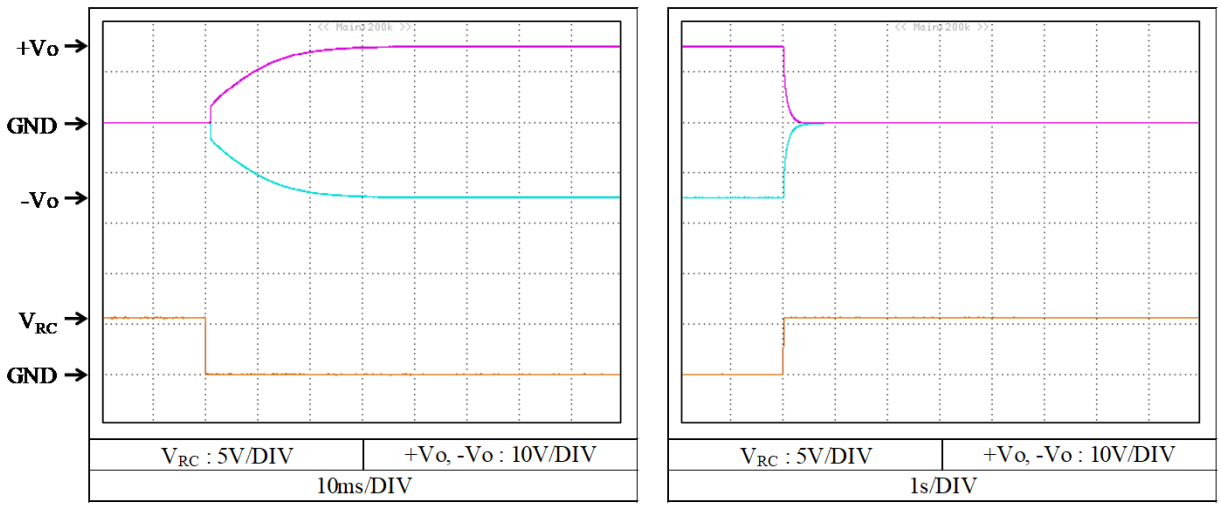
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

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

±12V



+15V

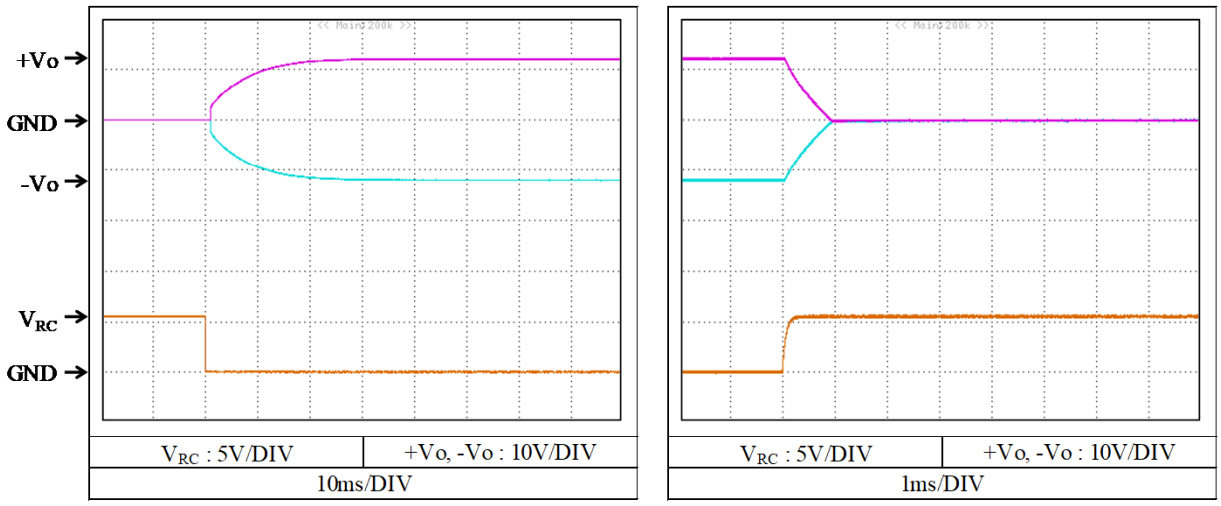


2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

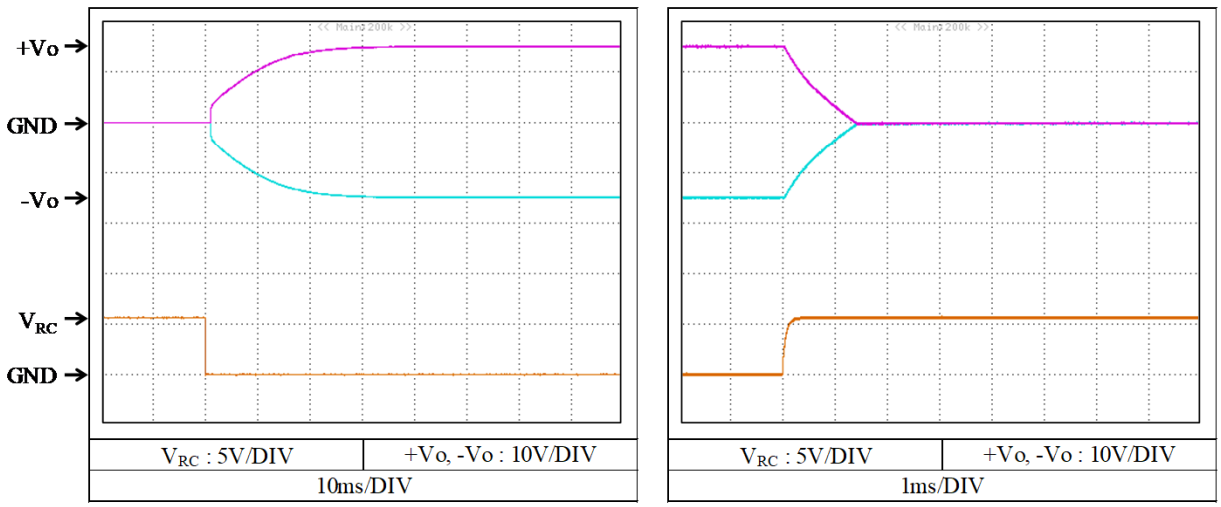
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

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

±12V



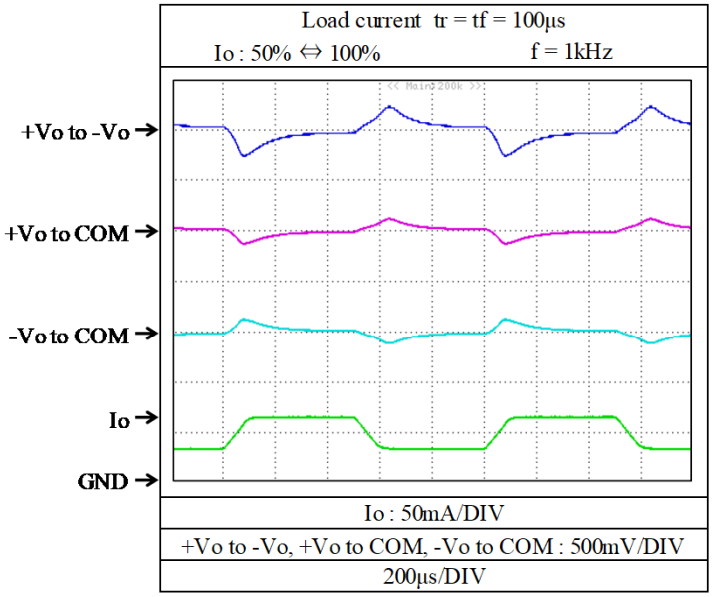
+15V



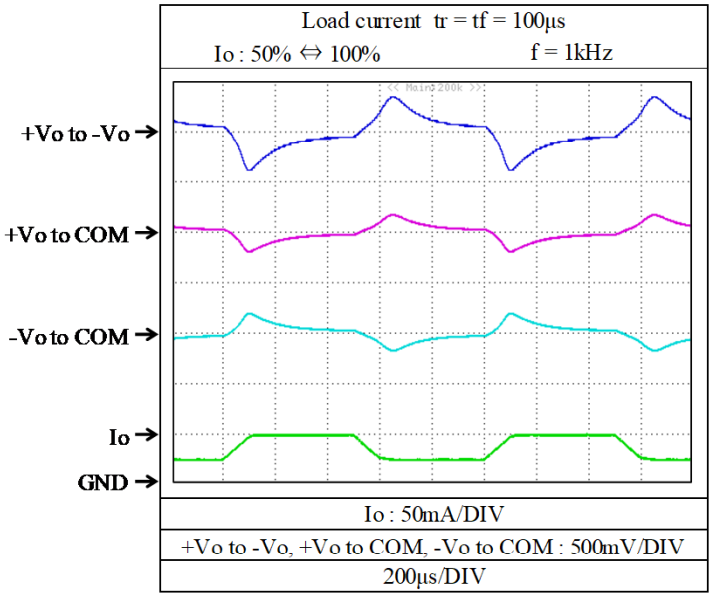
2-6. 過渡応答(負荷急変)特性 Dynamic load response characteristics

Conditions Vin : 24 VDC
Ta : 25 °C

±12V



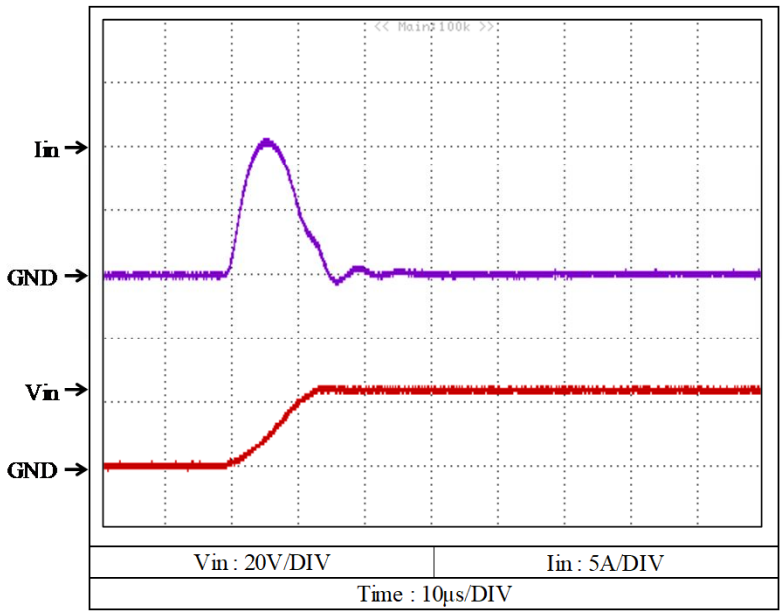
+15V



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

CCG3-24-05S

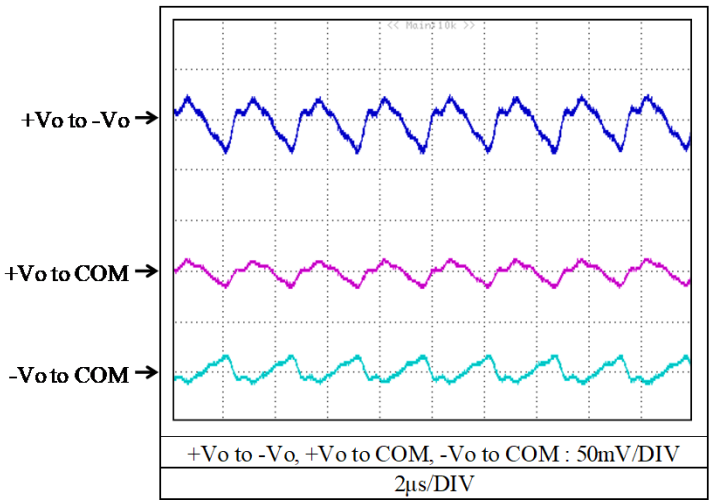


CCG1R5-24-xxDの入力サージ電流特性は CCG3-24-05S と同等です。
CCG1R5-24-xxD have the same Inrush current characteristics as CCG3-24-05S data.

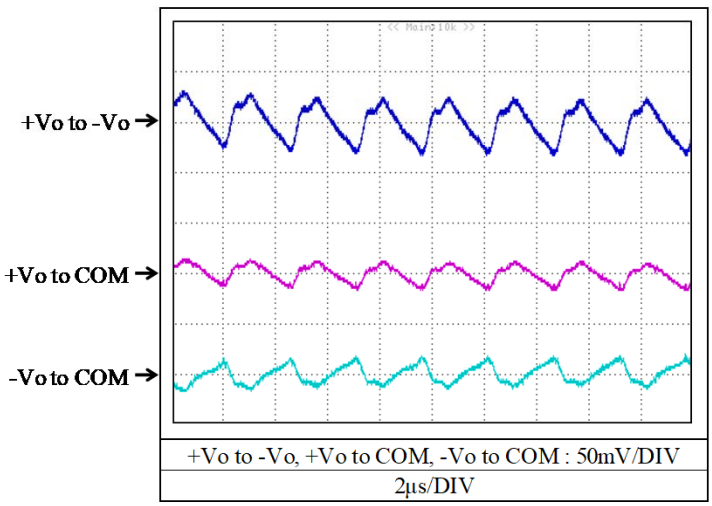
2-8. 出力リップルノイズ波形 Output ripple and noise waveform

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

±12V



+15V

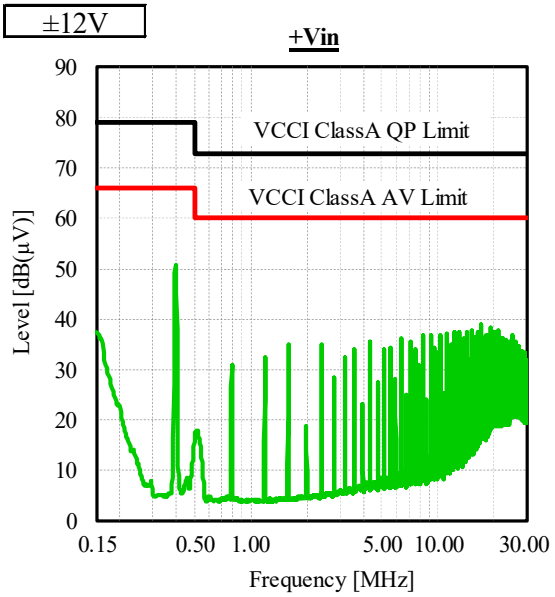


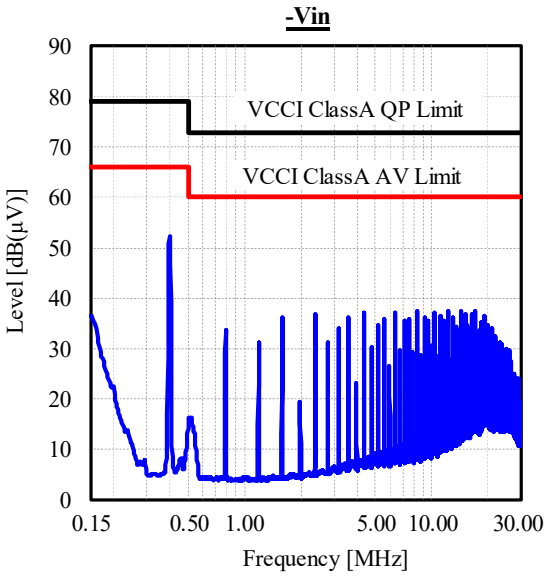
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

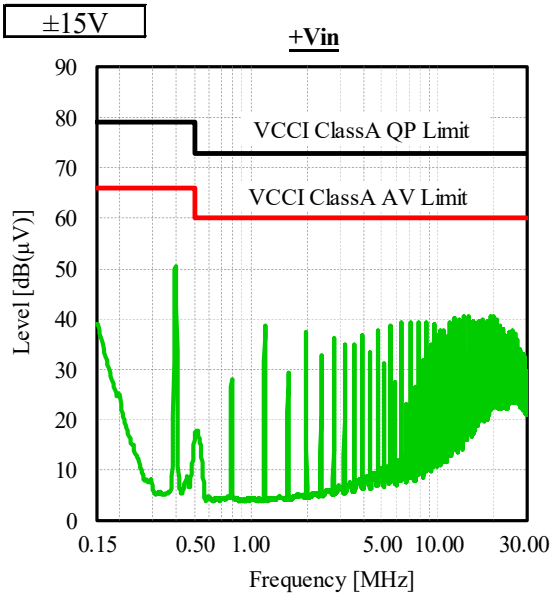
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

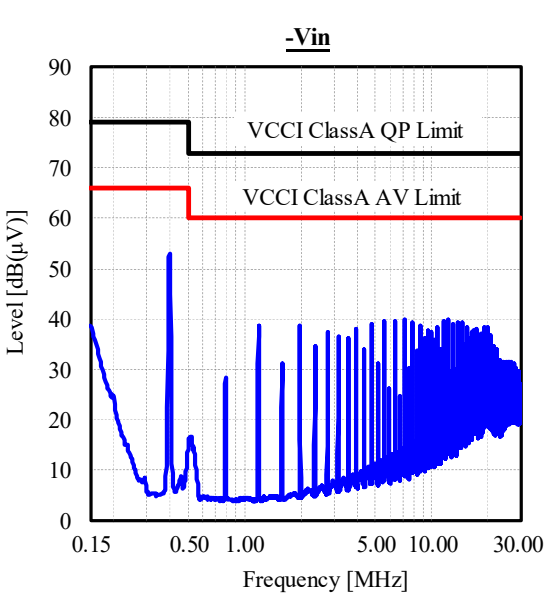
±12V





±15V





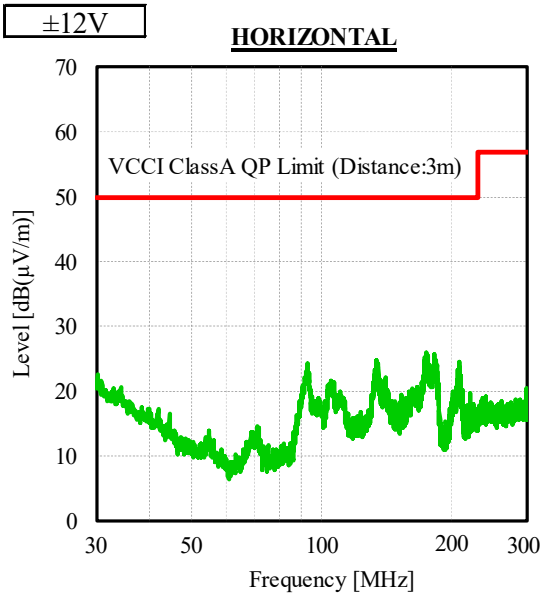
表示はQP値
Indication is QP values.

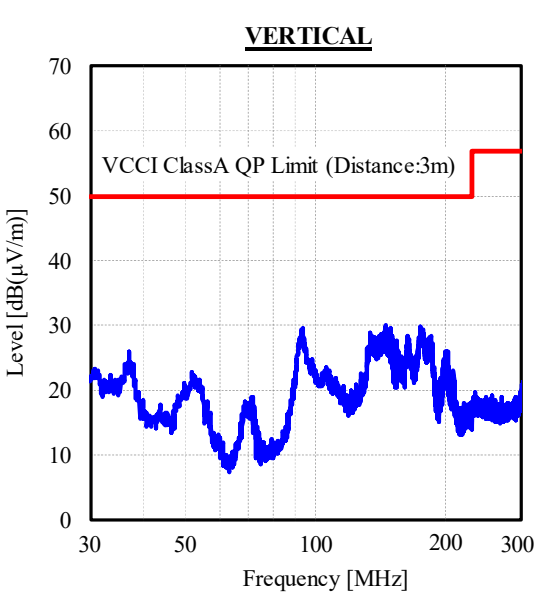
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

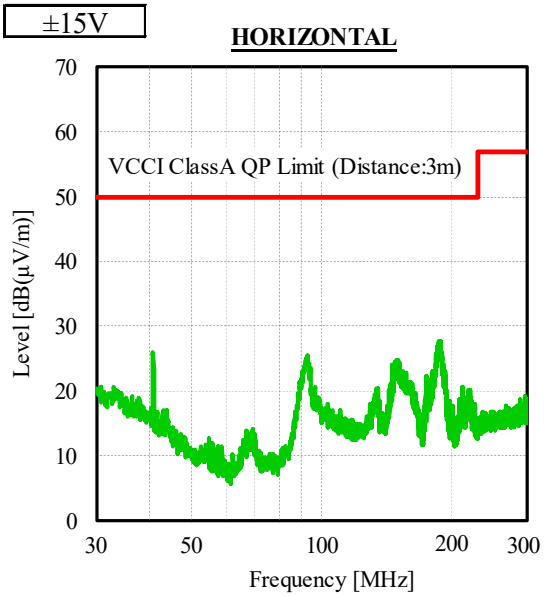
Conditions Vin : 24 VDC
Io : 100 %
Ta : 25 ºC

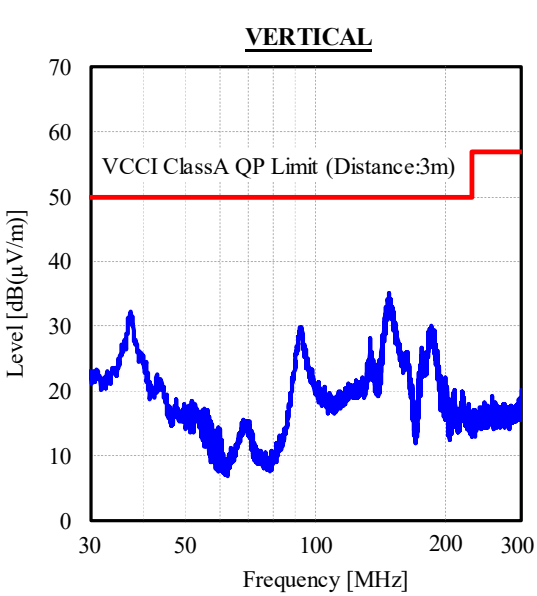
±12V





±15V





表示はピーク値
Indication is peak values.