CCG10-12-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

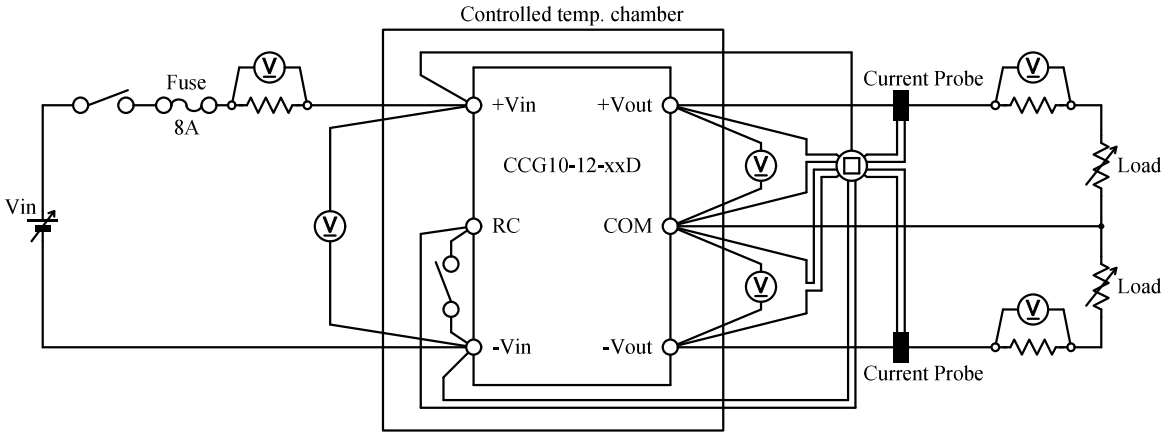
※ 当社測定条件における結果であり、参考値としてお考え願います。
Test results are reference data based on our measurement condition.

1. 測定方法 Evaluation Method

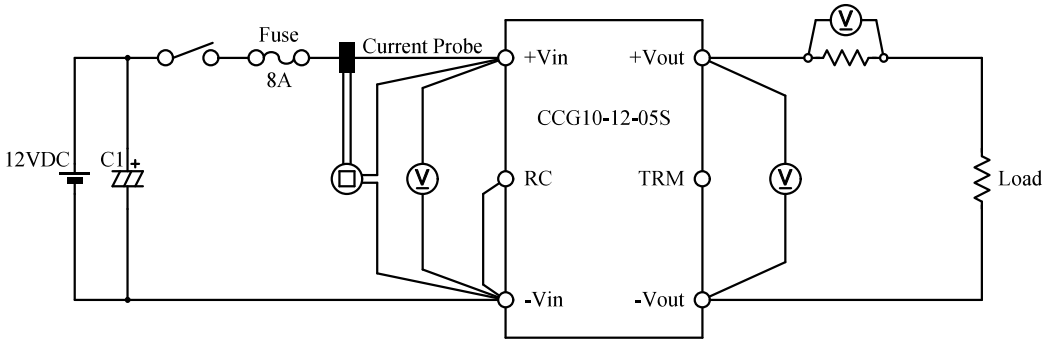
1-1. 測定回路 Measurement Circuits

(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



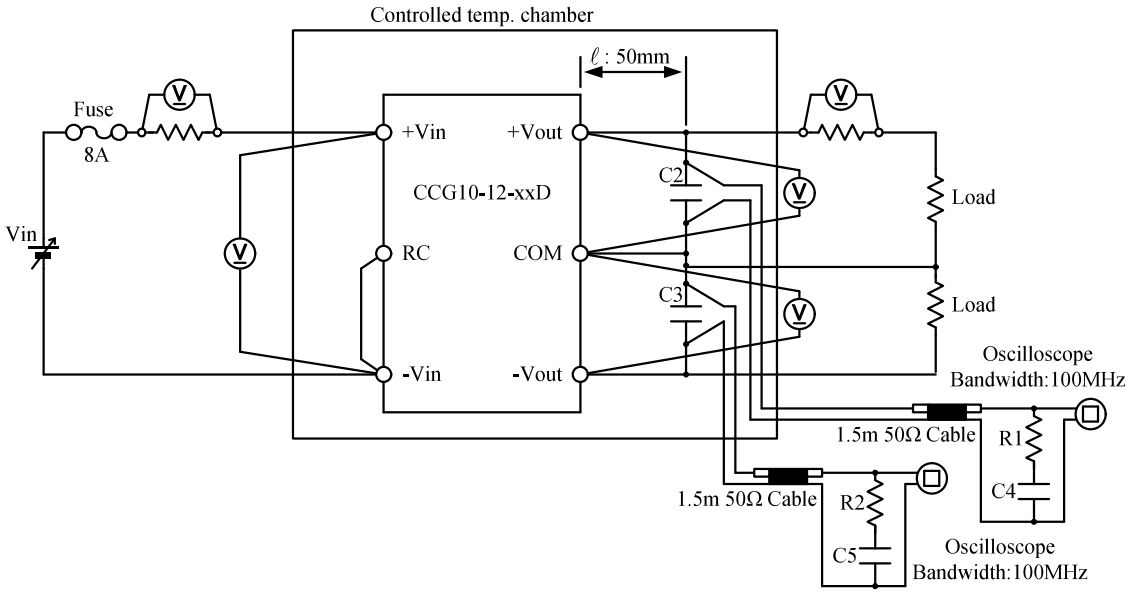
(2) 入力サージ電流（突入電流）波形 Inrush current waveform



CCG10-12-xxDの入力サージ電流特性はCCG10-12-05Sと同等です。

CCG10-12-xxD have the same Inrush current characteristics as CCG10-12-05S data.

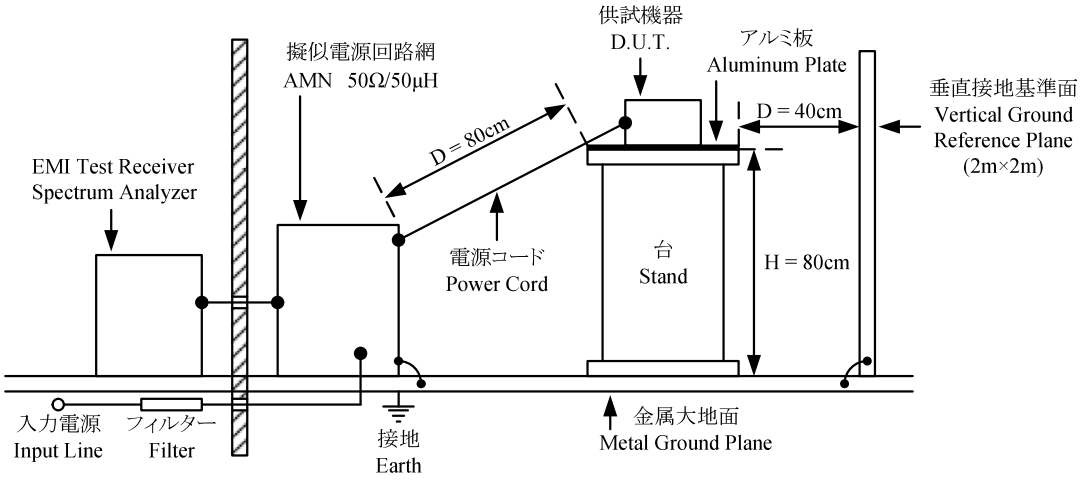
(3) 出力リップルノイズ電圧、波形 Output ripple and noise voltage and waveform



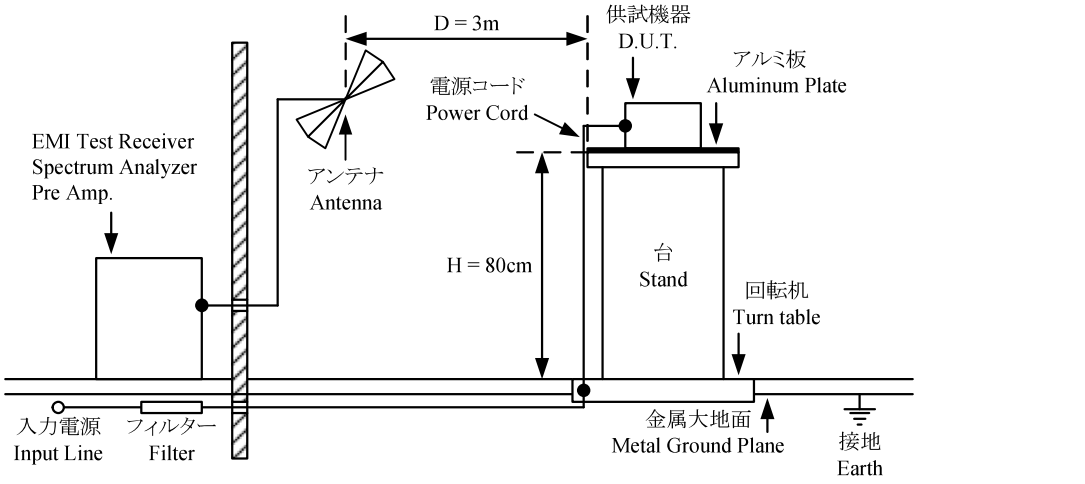
C1	: 4000uF	Electrolytic Capacitor
C2,C3	: 1uF	Ceramic Capacitor
C4,C5	: 4700pF	Ceramic Capacitor
R1,R2	: 50Ω	

(4) EMI特性　Electro-Magnetic Interference characteristics

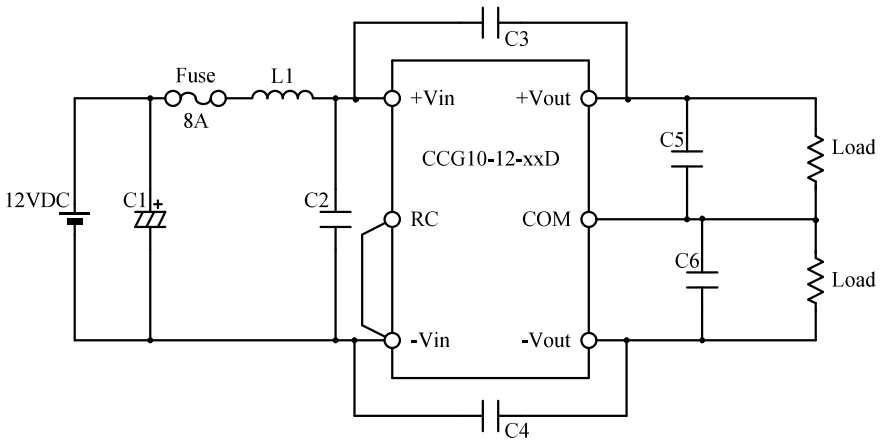
(a) 雑音端子電圧(帰還ノイズ) Conducted Emission Noise



(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	:	25V	470uF	Electrolytic Capacitor	(ELXZ250ELL471MJ16S,Nippon Chemi-con)
C2	:	50V	10uF	Ceramic Capacitor	(C3216X7R1H106KT,TDK)
C3	:	2kV	470pF	Ceramic Capacitor	(C3216X7S3D471K130AA,TDK)
C4	:	2kV	470pF	Ceramic Capacitor	(C3216X7S3D471K130AA,TDK)
C5	:	25V	10uF	Ceramic Capacitor	(C3216X7R1E106KT,TDK)
C6	:	25V	10uF	Ceramic Capacitor	(C3216X7R1E106KT,TDK)
L1	:	5A	1.5uH	Normal Mode Choke Coil	(LQH5BPN1R5NT0L,MURATA)

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	4.5VDC	5VDC	12VDC	18VDC	Line regulation	
0%	11.9995V	11.9992V	11.9940V	11.9965V	5.5mV	0.046%
50%(0.21A)	12.0249V	12.0242V	12.0196V	12.0184V	6.5mV	0.054%
100%(0.42A)	12.0362V	12.0333V	12.0230V	12.0203V	15.9mV	0.132%
Load	36.7mV	34.1mV	29.0mV	23.8mV		
regulation	0.306%	0.284%	0.242%	0.198%		

・−Vo

Io \ Vin	4.5VDC	5VDC	12VDC	18VDC	Line regulation	
0%	-12.0042V	-12.0065V	-12.0120V	-12.0091V	7.8mV	0.065%
50%(0.21A)	-11.9779V	-11.9795V	-11.9852V	-11.9864V	8.5mV	0.071%
100%(0.42A)	-11.9687V	-11.9721V	-11.9827V	-11.9854V	16.7mV	0.139%
Load	35.5mV	34.4mV	29.3mV	23.7mV		
regulation	0.296%	0.287%	0.244%	0.197%		

・+Vo to −Vo

Io \ Vin	4.5VDC	5VDC	12VDC	18VDC	Line regulation	
0%	24.0037V	24.0057V	24.0060V	24.0056V	2.3mV	0.010%
50%(0.21A)	24.0028V	24.0037V	24.0048V	24.0048V	2.0mV	0.008%
100%(0.42A)	24.0049V	24.0054V	24.0057V	24.0057V	0.8mV	0.003%
Load	2.1mV	2.0mV	1.2mV	0.9mV		
regulation	0.009%	0.008%	0.005%	0.004%		

2. Temperature drift　　Conditions　Vin :　12 VDC
Io :　100 %

Ta	-40°C	25°C	60°C	Temperature stability	
+Vo	11.9554V	12.0230V	12.0271V	71.7mV	0.598%
-Vo	-11.9181V	-11.9827V	-11.9852V	67.1mV	0.559%
+Vo to -Vo	23.8736V	24.0057V	24.0123V	138.7mV	0.578%

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

・+Vo (-Io : 100%)

+Io \ Vin	4.5VDC	5VDC	12VDC	18VDC
20%(0.084A)	12.1809V	12.1732V	12.1732V	12.1535V
100%(0.42A)	12.0387V	12.0359V	12.0359V	12.0224V
Load	142.2mV	137.3mV	137.3mV	131.1mV
regulation	1.185%	1.144%	1.144%	1.093%

・−Vo (+Io : 100%)

-Io \ Vin	4.5VDC	5VDC	12VDC	18VDC
20%(0.084A)	-12.1173V	-12.1133V	-12.1133V	-12.1128V
100%(0.42A)	-11.9702V	-11.9736V	-11.9736V	-11.9861V
Load	147.1mV	139.7mV	139.7mV	126.7mV
regulation	1.226%	1.164%	1.164%	1.056%

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

・+Vo

Io \ Vin	4.5VDC	5VDC	12VDC	18VDC	Line regulation	
0%	15.0352V	15.0344V	15.0311V	15.0288V	6.4mV	0.043%
50%(0.17A)	15.0571V	15.0575V	15.0546V	15.0541V	3.4mV	0.023%
100%(0.34A)	15.0578V	15.0582V	15.0580V	15.0555V	2.7mV	0.018%
Load	22.6mV	23.8mV	26.9mV	26.7mV		
regulation	0.151%	0.159%	0.179%	0.178%		

・−Vo

Io \ Vin	4.5VDC	5VDC	12VDC	18VDC	Line regulation	
0%	-15.0501V	-15.0510V	-15.0532V	-15.0556V	5.5mV	0.037%
50%(0.17A)	-15.0281V	-15.0276V	-15.0300V	-15.0302V	2.6mV	0.017%
100%(0.34A)	-15.0274V	-15.0266V	-15.0265V	-15.0277V	1.2mV	0.008%
Load	22.7mV	24.4mV	26.7mV	27.9mV		
regulation	0.151%	0.163%	0.178%	0.186%		

・+Vo to −Vo

Io \ Vin	4.5VDC	5VDC	12VDC	18VDC	Line regulation	
0%	30.0853V	30.0854V	30.0843V	30.0844V	1.1mV	0.004%
50%(0.17A)	30.0852V	30.0851V	30.0846V	30.0843V	0.9mV	0.003%
100%(0.34A)	30.0852V	30.0849V	30.0846V	30.0833V	1.9mV	0.006%
Load	0.1mV	0.5mV	0.3mV	1.1mV		
regulation	0.000%	0.002%	0.001%	0.004%		

2. Temperature drift Conditions Vin : 12 VDC
Io : 100 %

Ta	-40°C	25°C	60°C	Temperature stability	
+Vo	15.0051V	15.0580V	15.0221V	52.9mV	0.353%
-Vo	-14.9740V	-15.0265V	-14.9903V	52.5mV	0.350%
+Vo to -Vo	29.9792V	30.0846V	30.0124V	105.4mV	0.351%

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

・+Vo (-Io : 100%)

+Io \ Vin	4.5VDC	5VDC	12VDC	18VDC
20%(0.068A)	15.1976V	15.1911V	15.1911V	15.1787V
100%(0.34A)	15.0577V	15.0578V	15.0578V	15.0556V
Load	139.9mV	133.3mV	133.3mV	123.1mV
regulation	0.933%	0.889%	0.889%	0.821%

・−Vo (+Io : 100%)

-Io \ Vin	4.5VDC	5VDC	12VDC	18VDC
20%(0.068A)	-15.1722V	-15.1665V	-15.1665V	-15.1643V
100%(0.34A)	-15.0258V	-15.0255V	-15.0255V	-15.0259V
Load	146.4mV	141.0mV	141.0mV	138.4mV
regulation	0.976%	0.940%	0.940%	0.923%

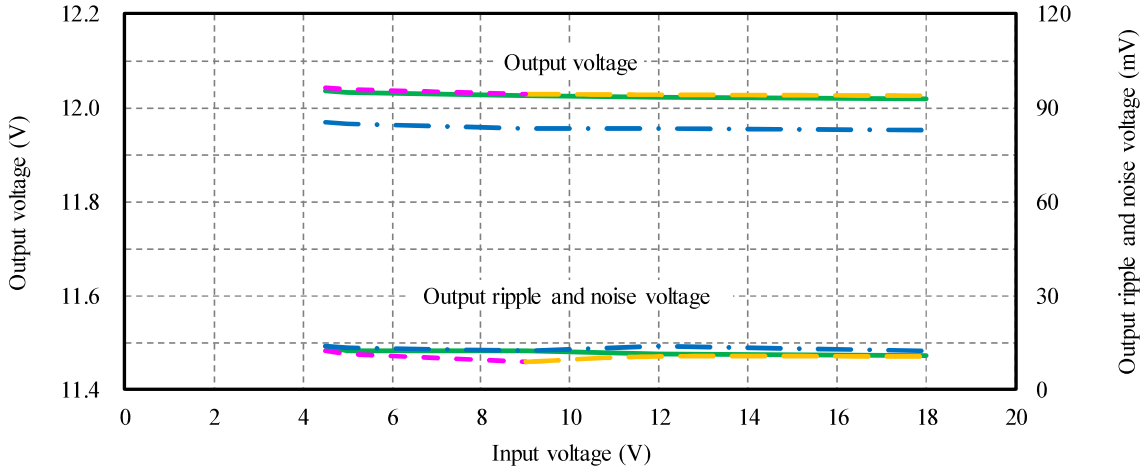
(2) 出力電圧・出力リップルノイズ電圧 対 入力電圧

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

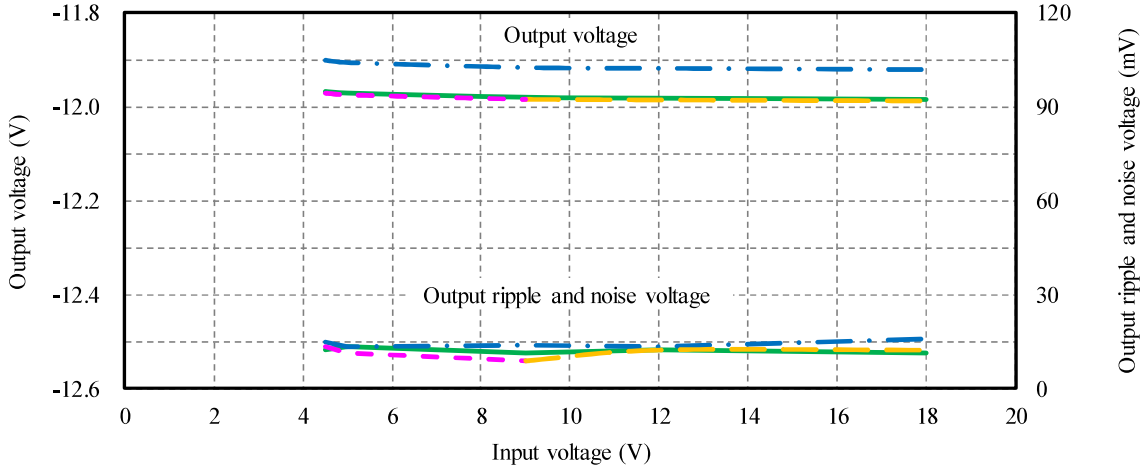
Conditions Io : 100 %
Ta : -40 °C
: 25 °C
: 50 °C
: 60 °C

±12V

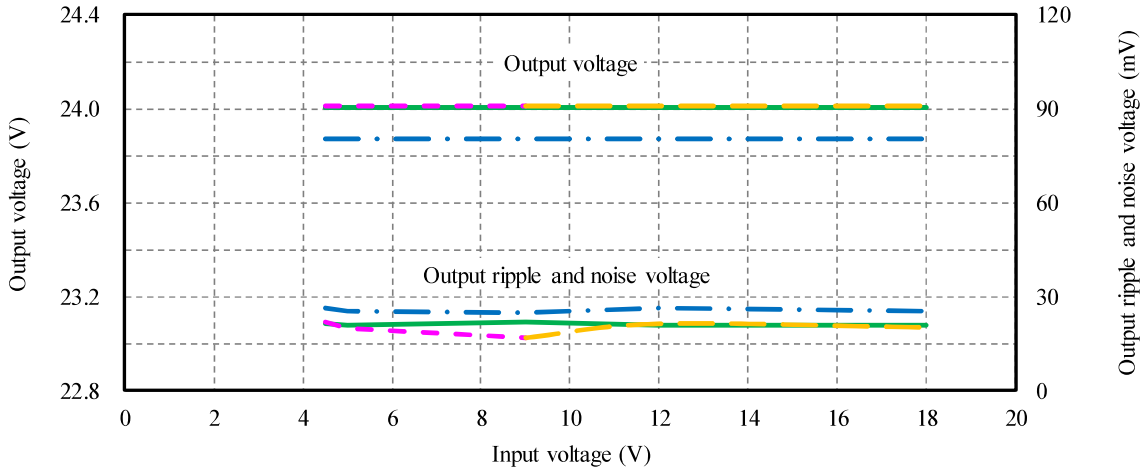
・+Vo



・−Vo



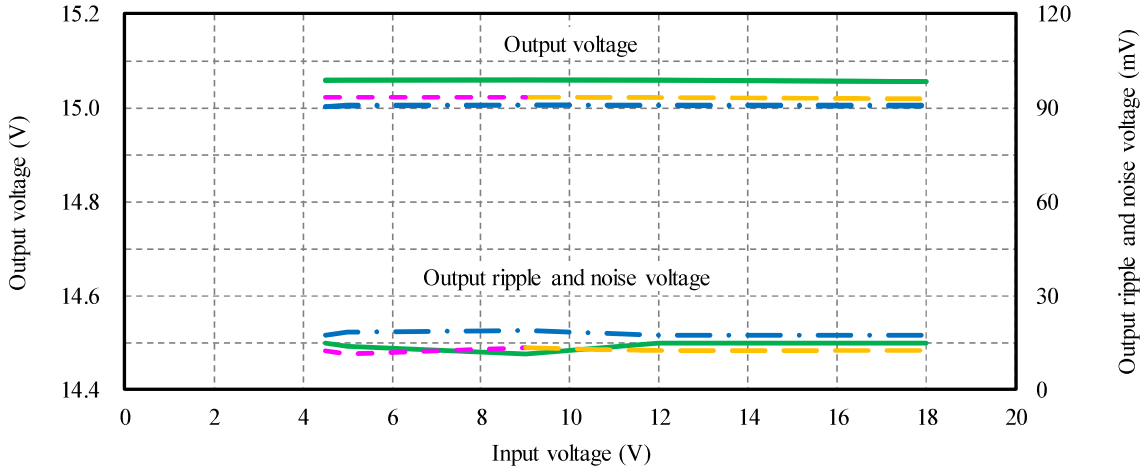
・+Vo to -Vo



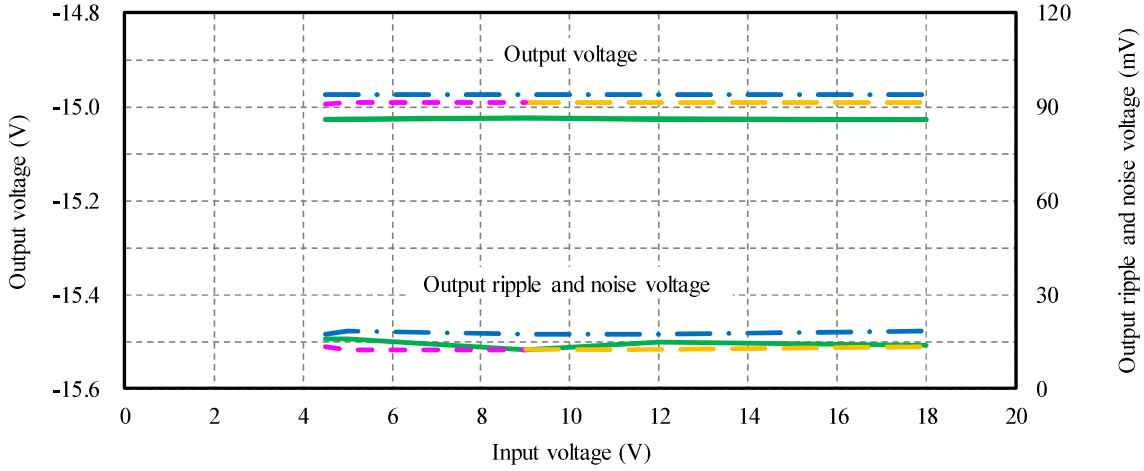
Conditions Io : 100 %
Ta : -40 °C
: 25 °C
: 50 °C
: 60 °C

±15V

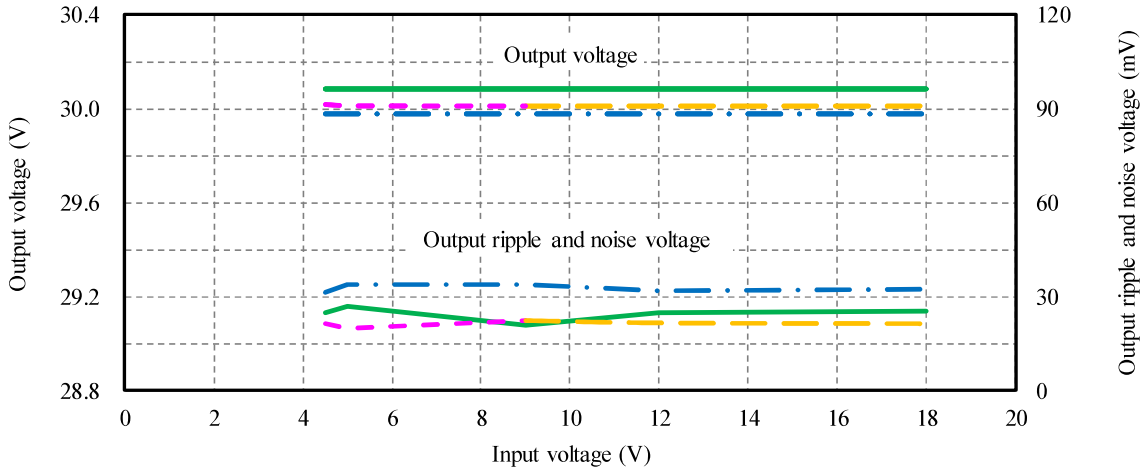
・+Vo



・−Vo



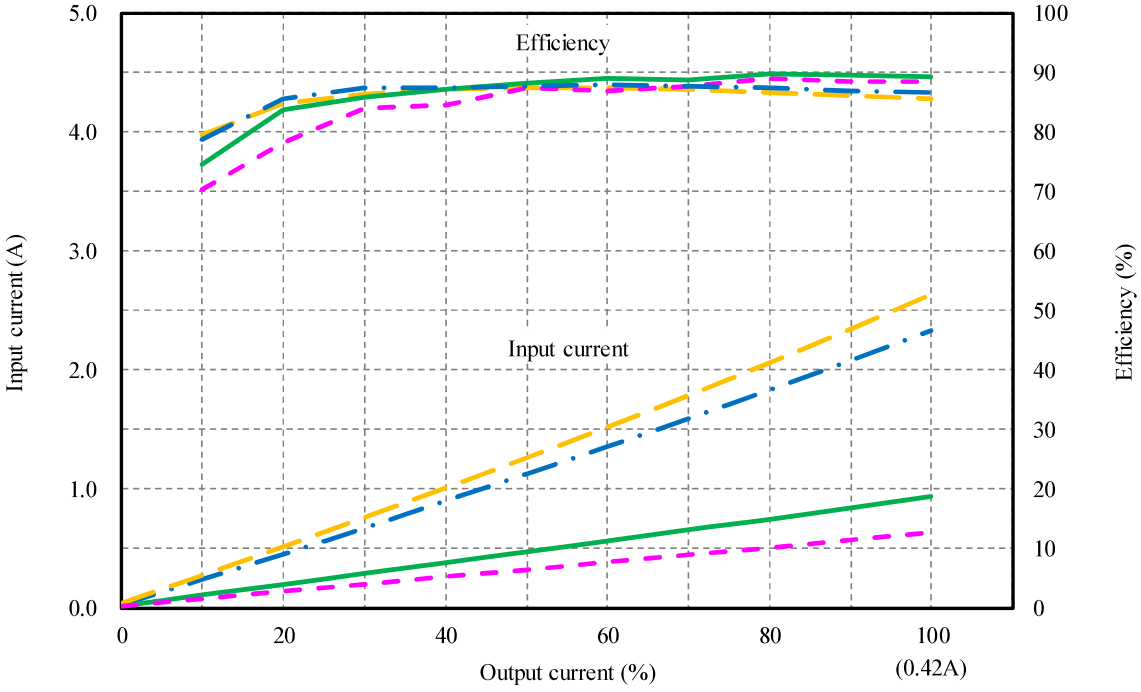
・+Vo to -Vo



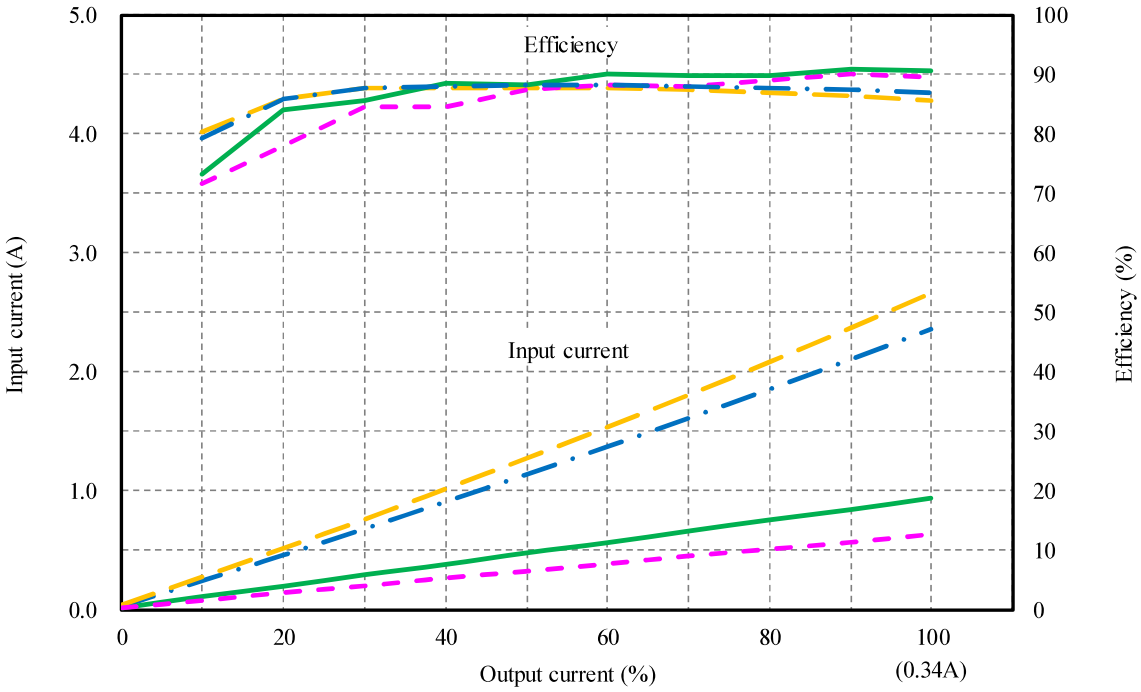
(3) 入力電流･効率 対 出力電流 Input current and Efficiency vs. Output current

Conditions Vin : 4.5 VDC
: 5 VDC
: 12 VDC
: 18 VDC
Ta : 25 °C

±12V



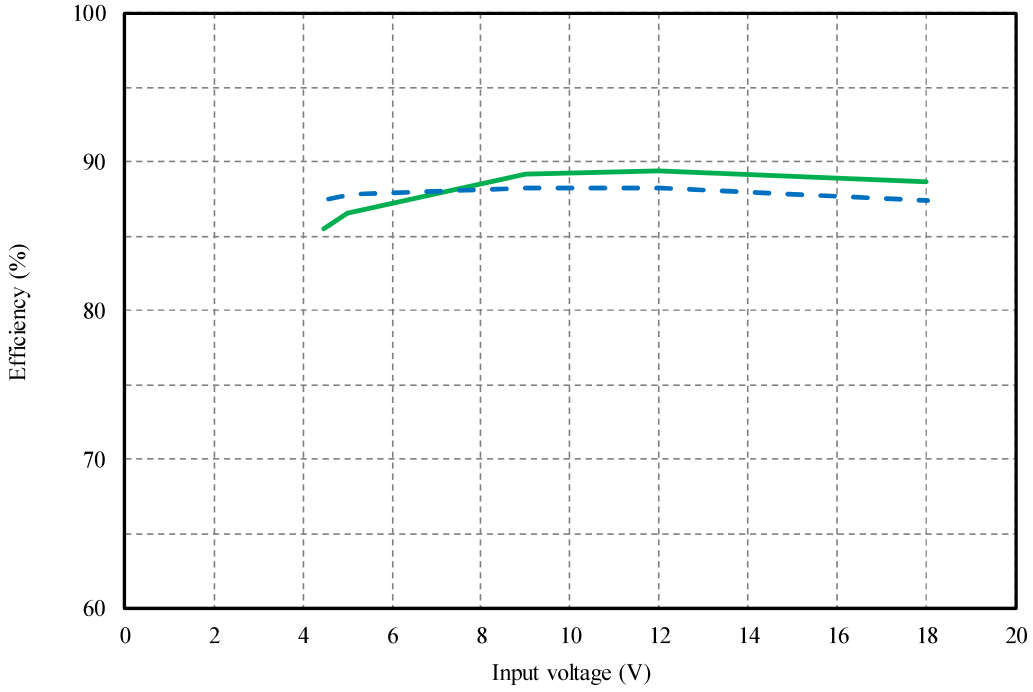
±15V



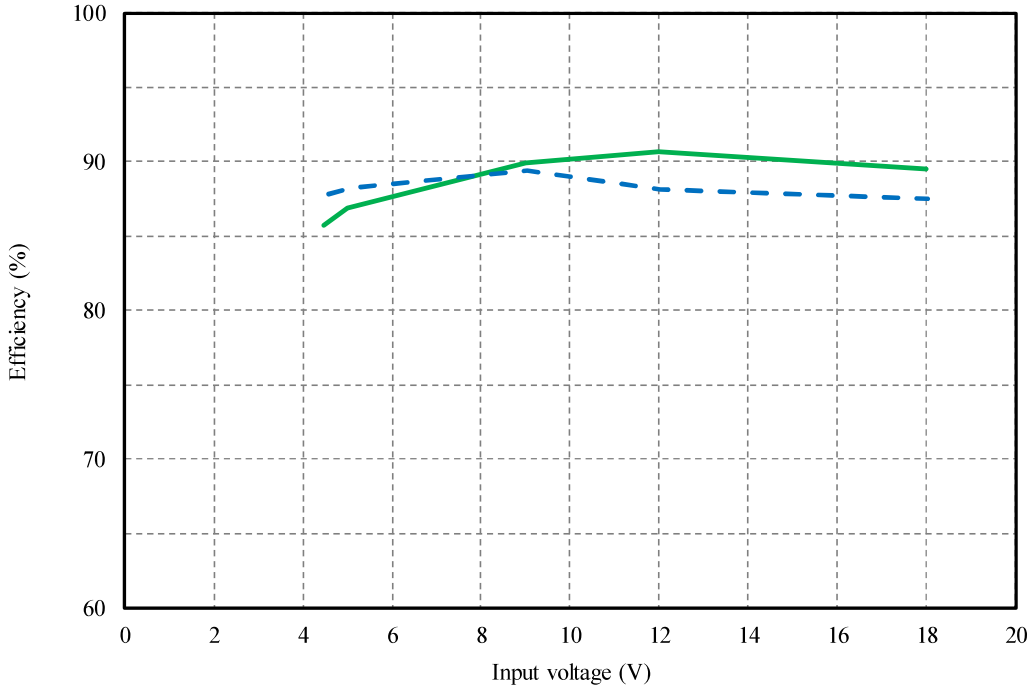
(4) 効率 対 入力電圧 Efficiency vs. Input voltage

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

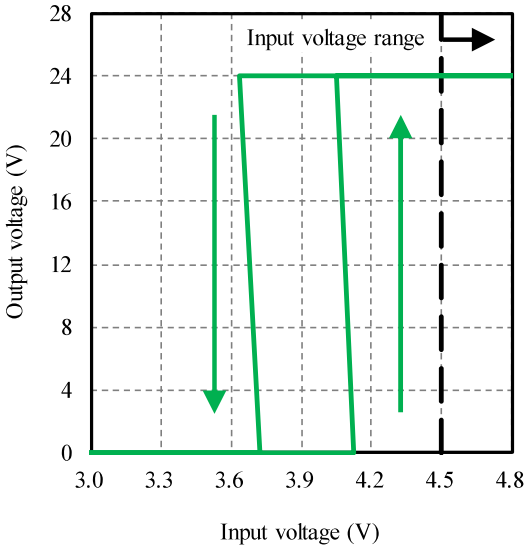
出力電圧 対 入力電圧
Output voltage vs. Input voltage

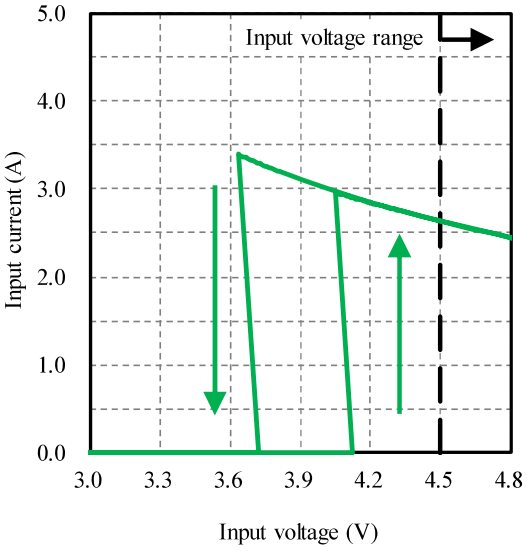
Conditions Io : 100 %
Ta : 25 °C

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

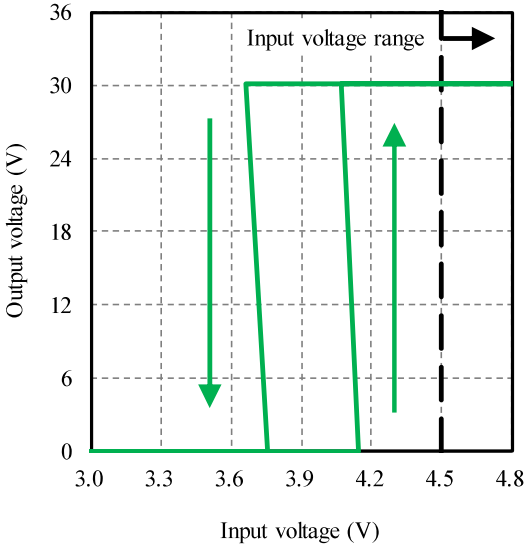
Conditions Io : 100 %
Ta : 25 °C

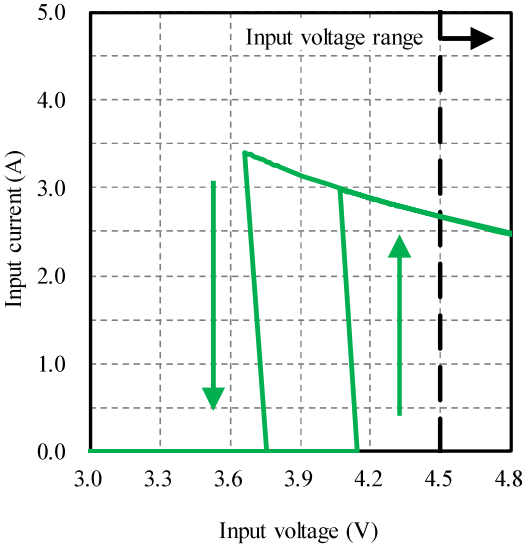
±12V





±15V

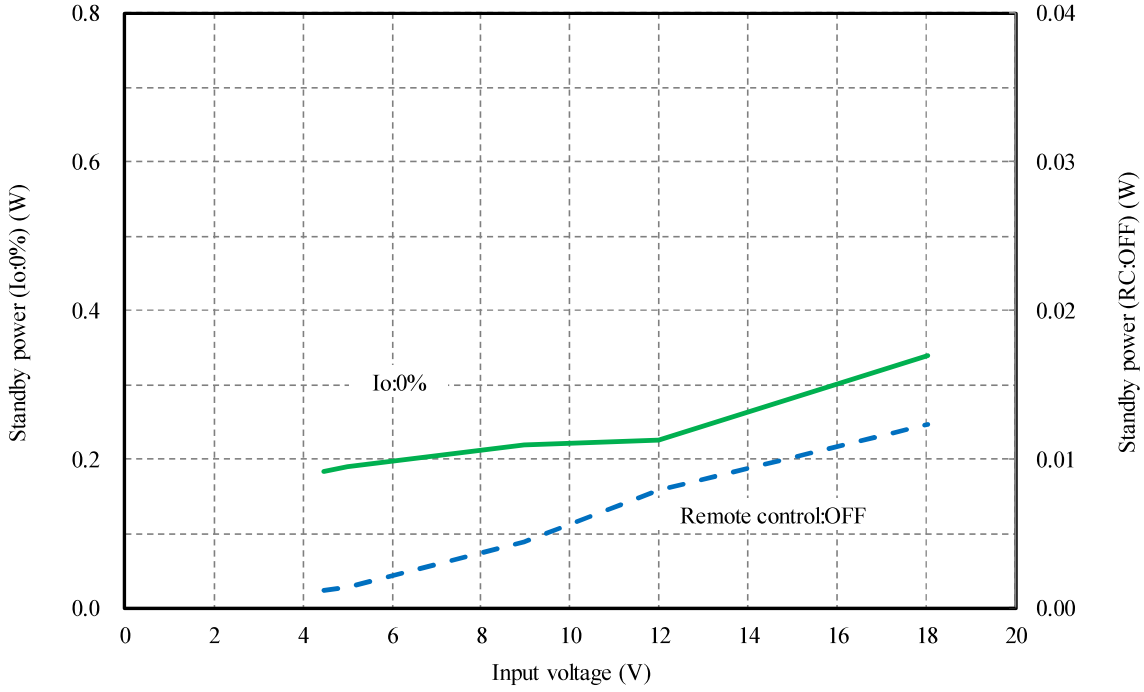




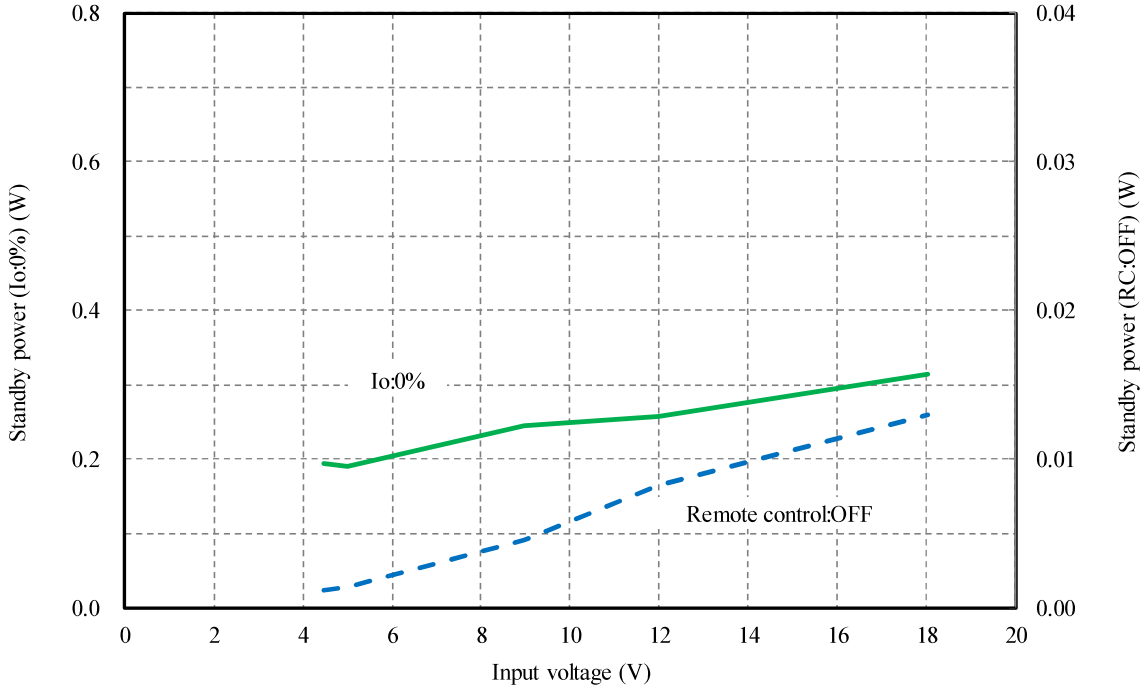
2-2. 待機電力特性 Standby power characteristics

Condition Ta : 25 °C

±12V



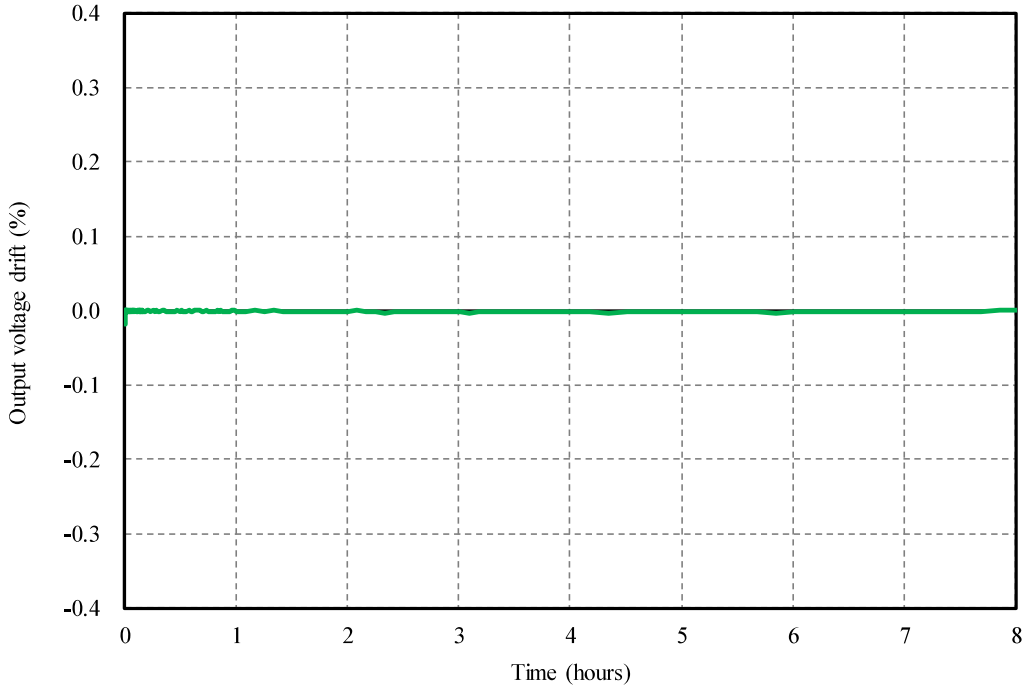
±15V



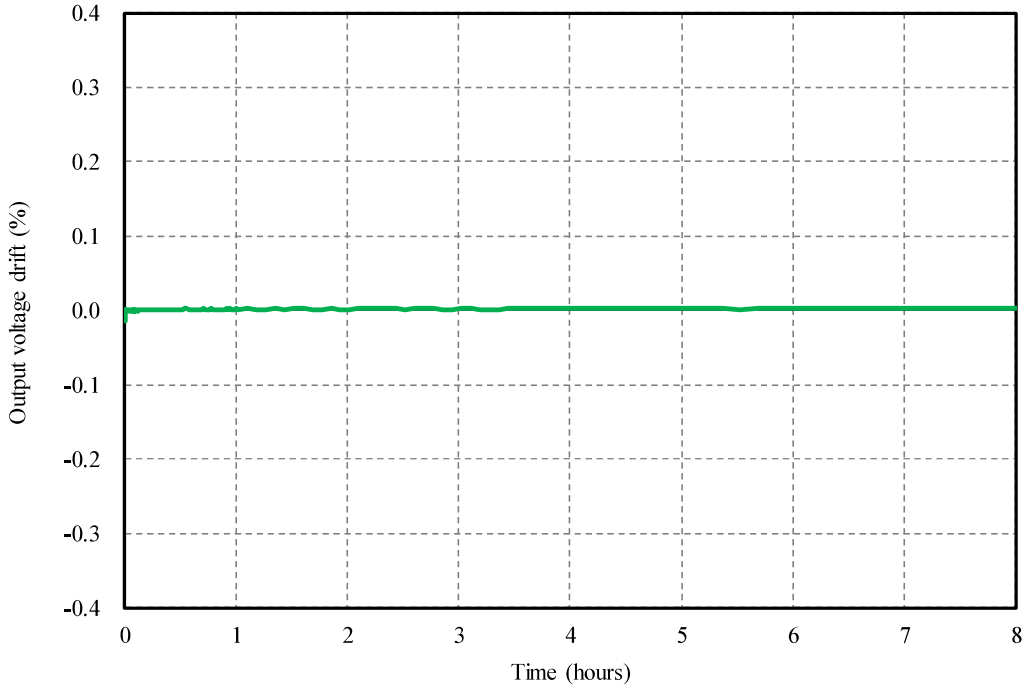
2-3. 通電ドリフト特性 Warm up voltage drift characteristics

Conditions Vin : 12 VDC
Io : 100 %
Ta : 25 °C

±12V



±15V



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

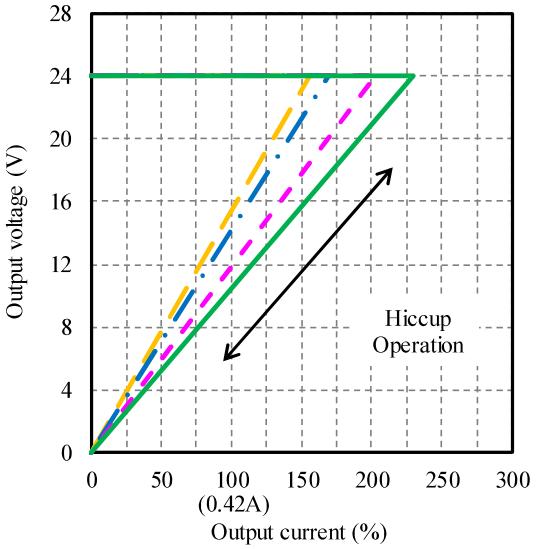
入力電圧依存性
Input voltage dependence

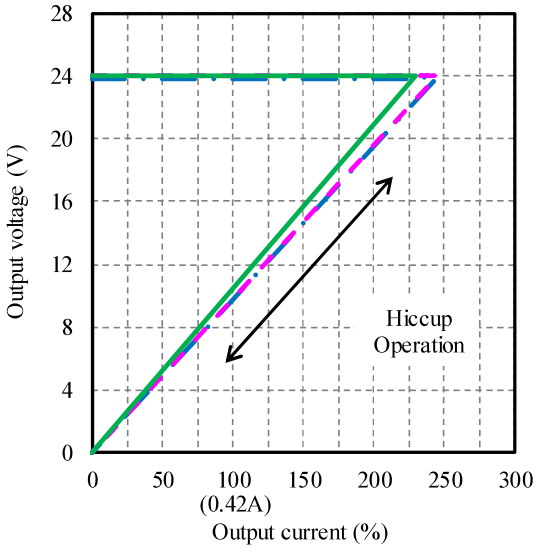
Conditions Vin : 4.5 VDC
: 5 VDC
: 12 VDC
: 18 VDC
Ta : 25 °C

周囲温度依存性
Ambient temperature dependence

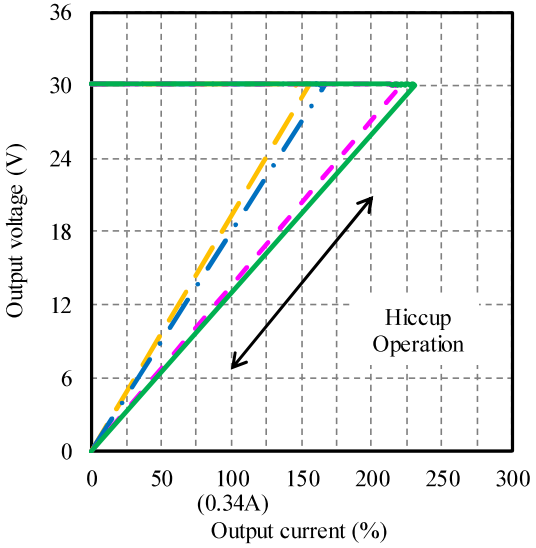
Conditions Vin : 12 VDC
Ta : -40 °C
: 25 °C
: 60 °C

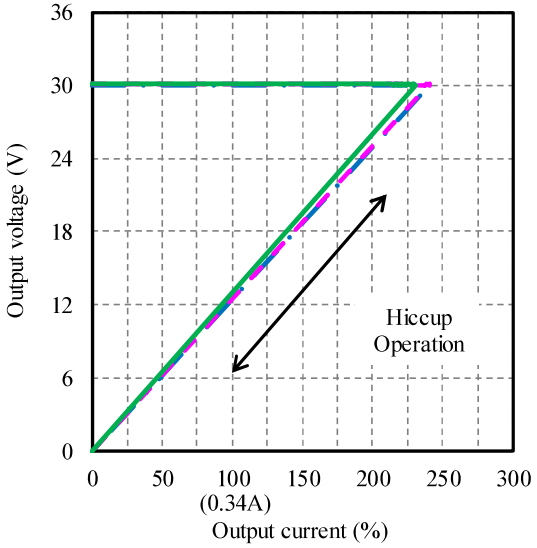
±12V





±15V

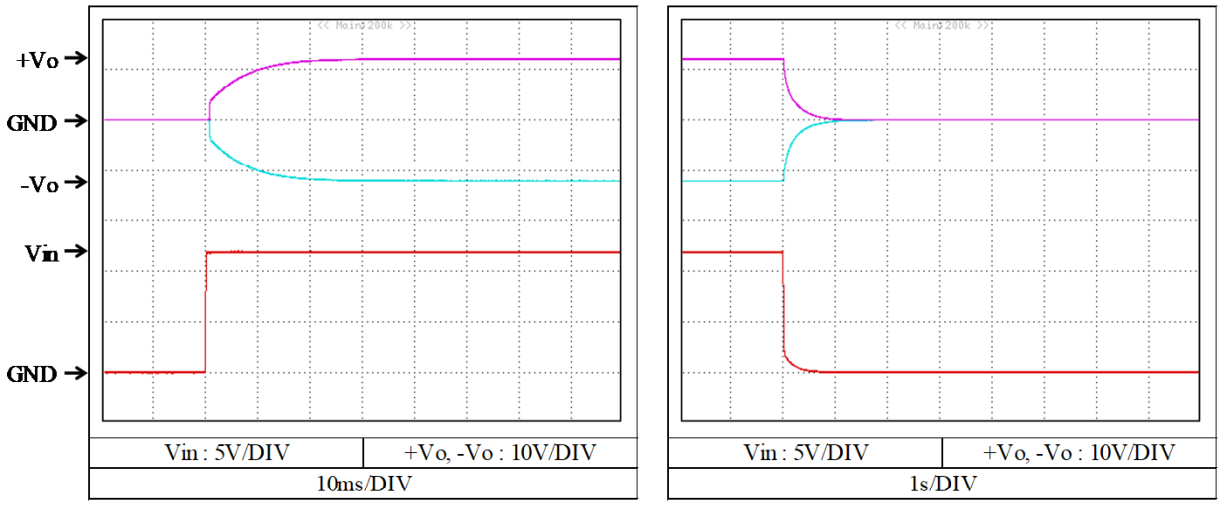




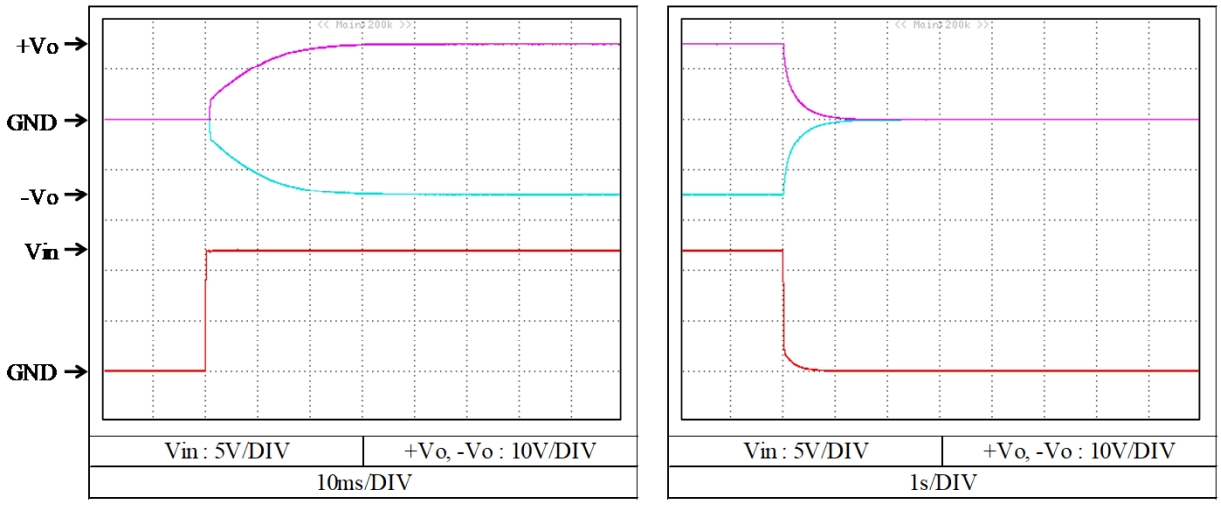
2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

Conditions Vin : 12 VDC
Io : 0 %
Ta : 25 °C

±12V



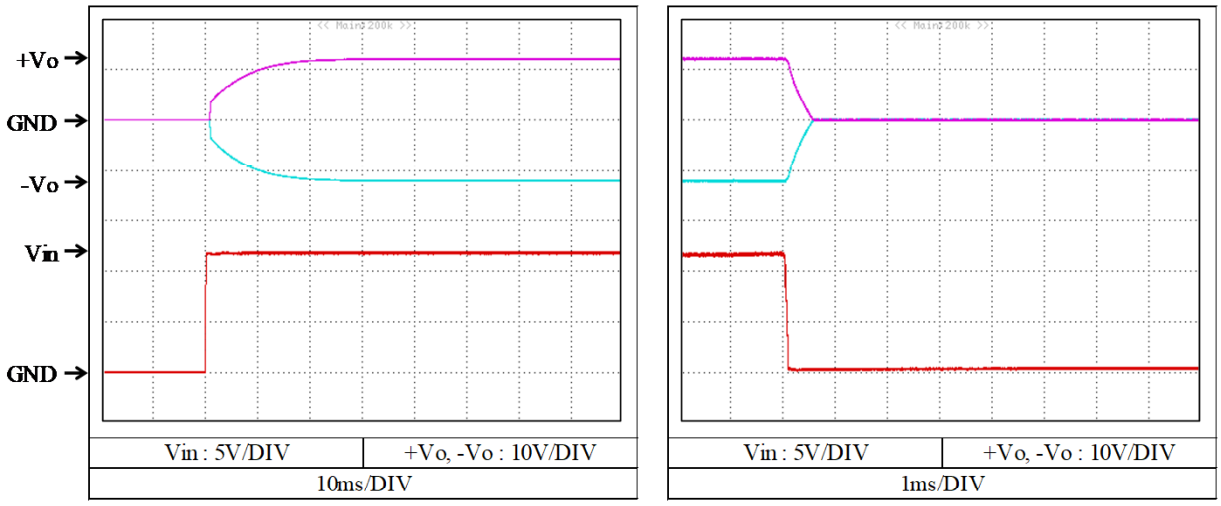
+15V



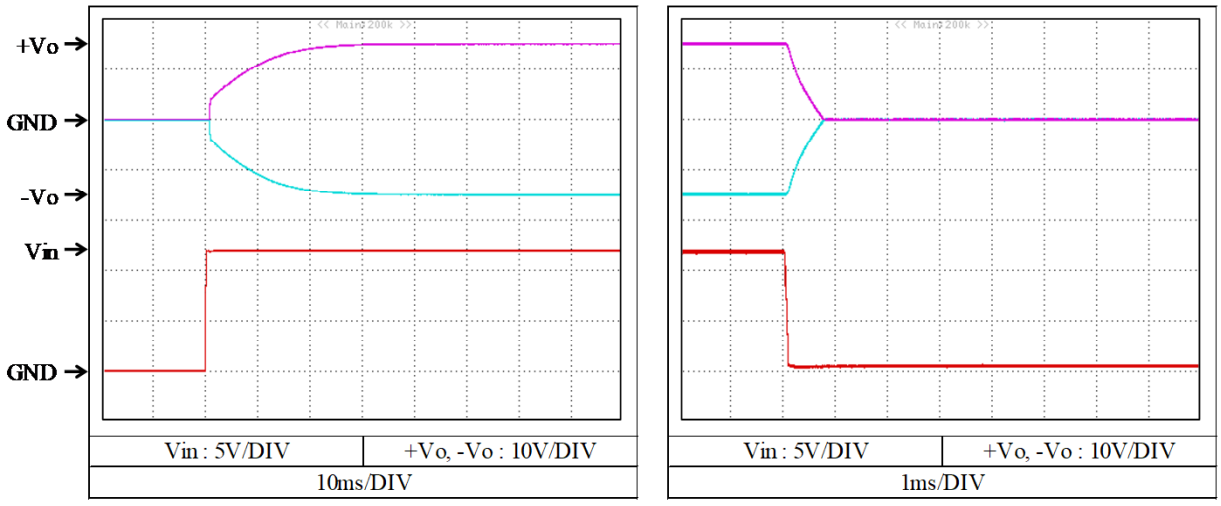
2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

Conditions Vin : 12 VDC
Io : 100 %
Ta : 25 °C

±12V



+15V

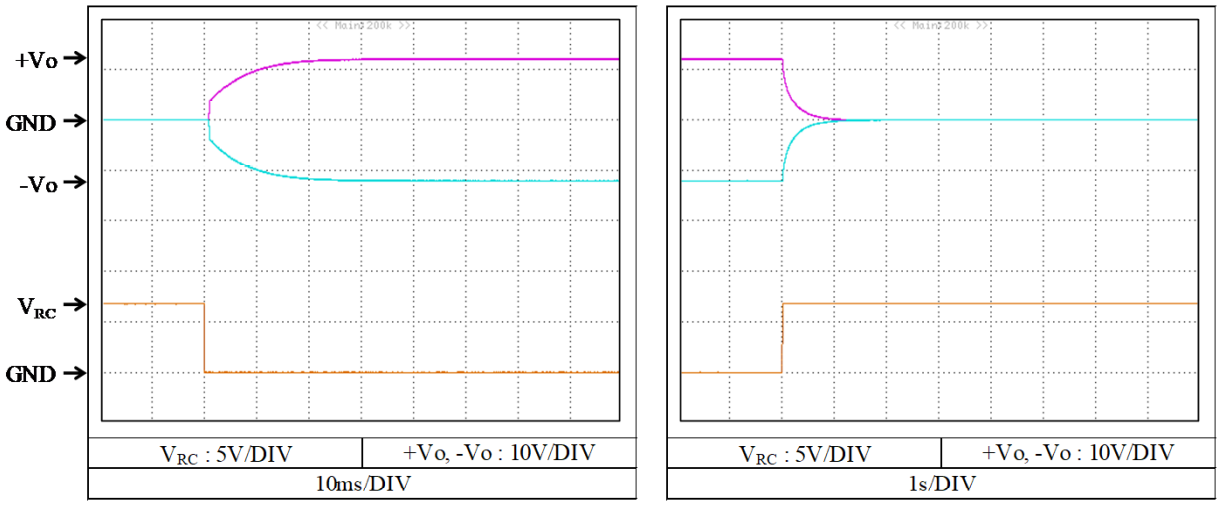


2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

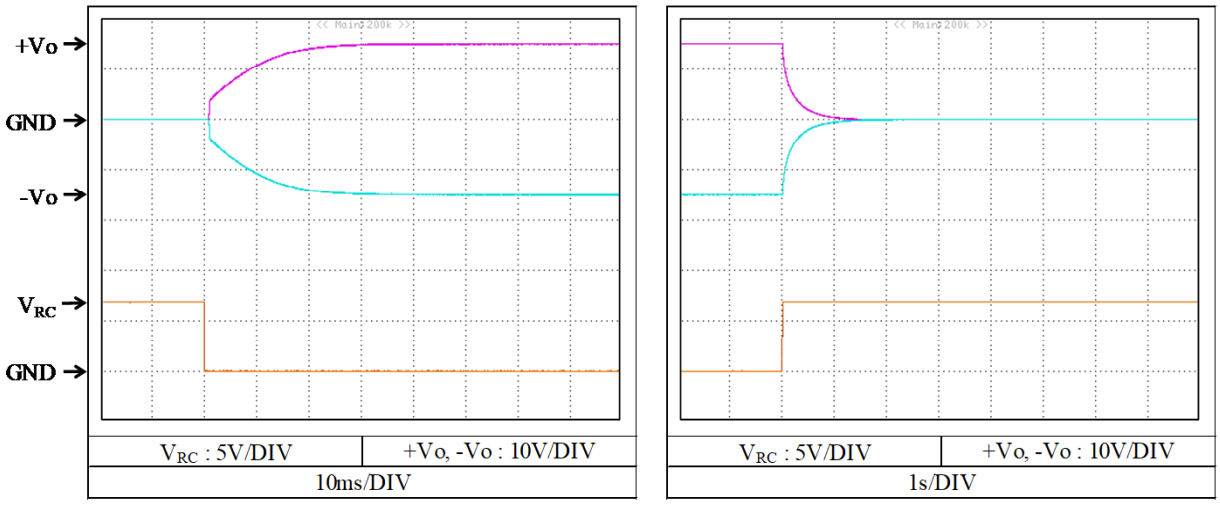
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

Conditions Vin : 12 VDC
Io : 0 %
Ta : 25 °C

±12V



+15V

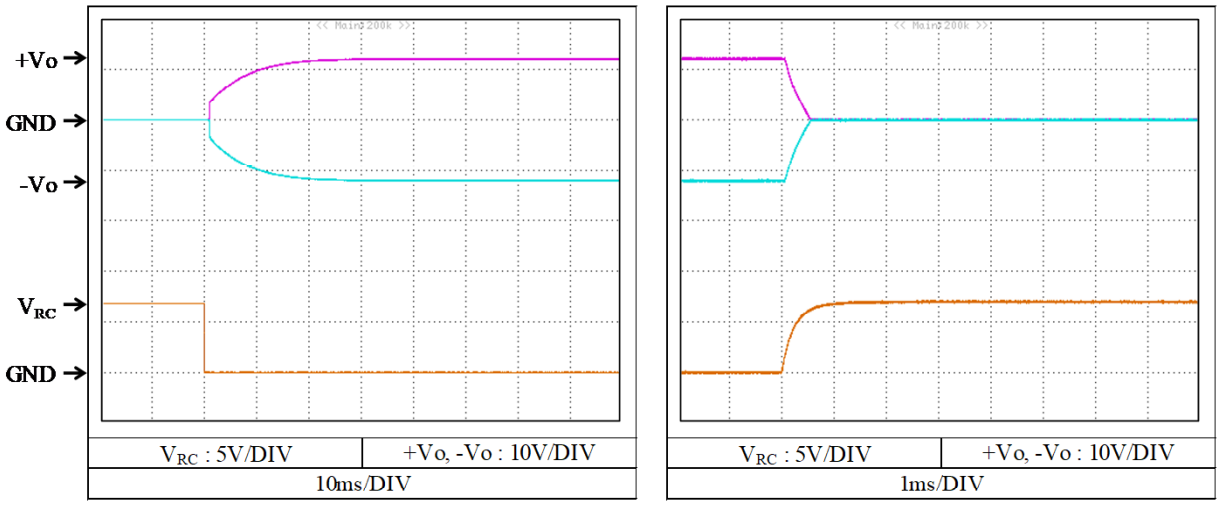


2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

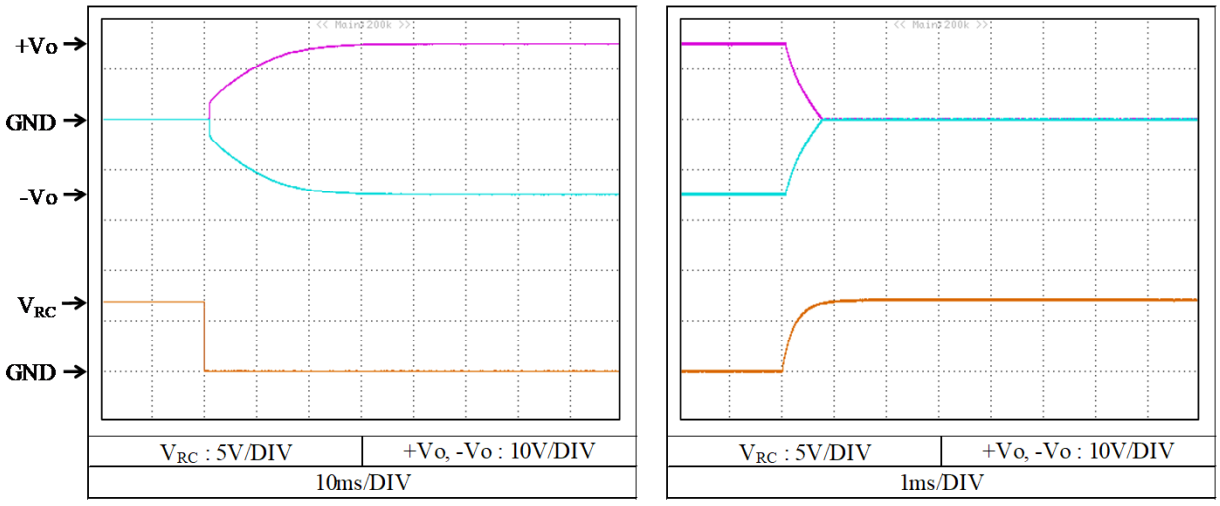
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

Conditions Vin : 12 VDC
Io : 100 %
Ta : 25 °C

±12V



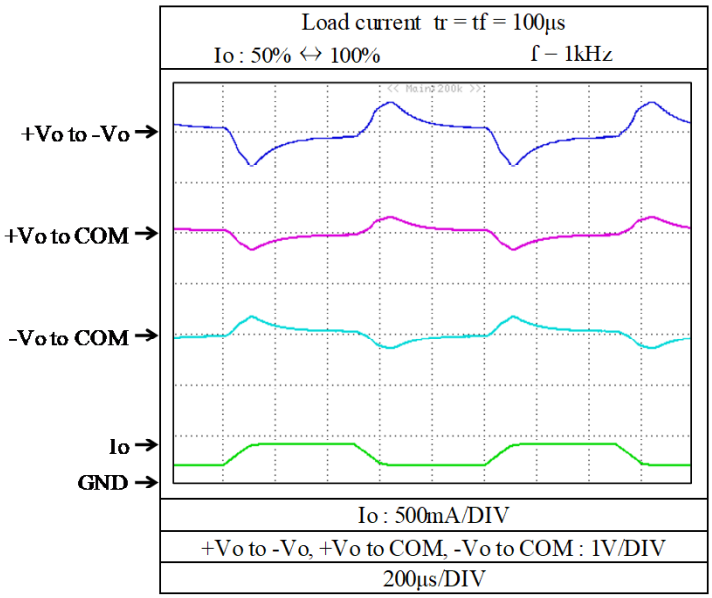
+15V



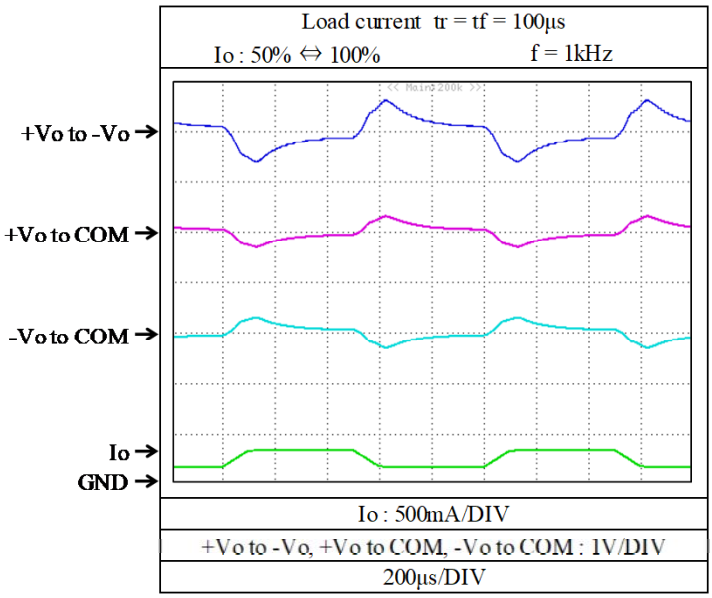
2-6. 過渡応答(負荷急変)特性 Dynamic load response characteristics

Conditions Vin : 12 VDC
Ta : 25 °C

±12V



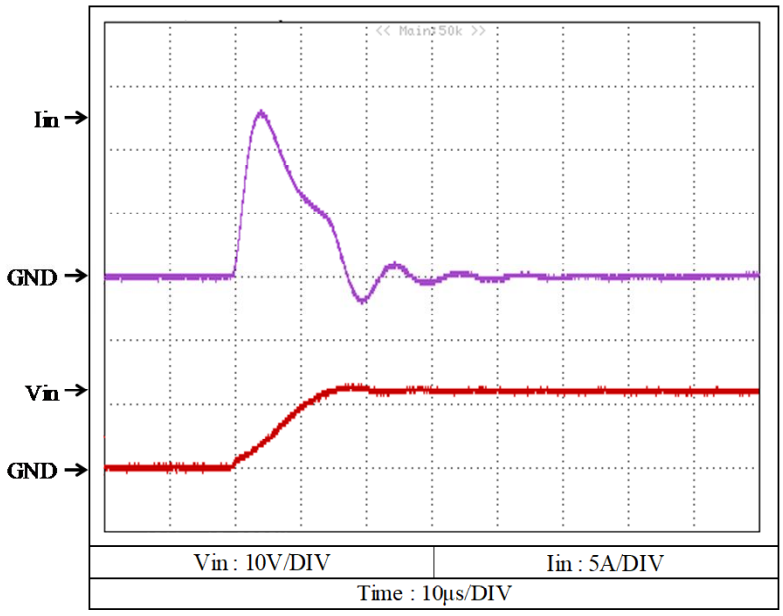
+15V



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

Conditions Vin : 12 VDC
Io : 100 %
Ta : 25 °C

CCG10-12-05S

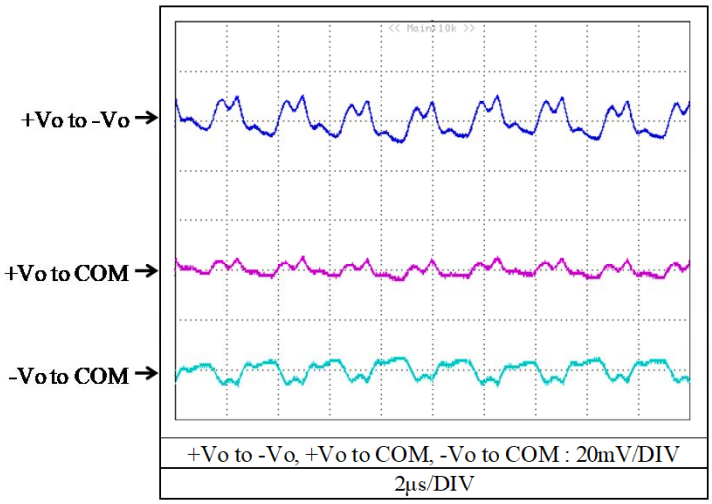


CCG10-12-xxDの入力サージ電流特性は CCG10-12-05S と同等です。
CCG10-12-xxD have the same Inrush current characteristics as CCG10-12-05S data.

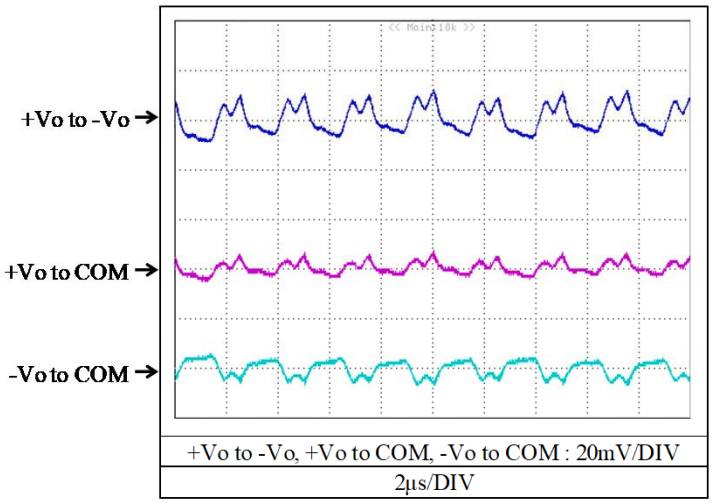
2-8. 出力リップルノイズ波形 Output ripple and noise waveform

Conditions Vin : 12 VDC
Io : 100 %
Ta : 25 °C

±12V



+15V

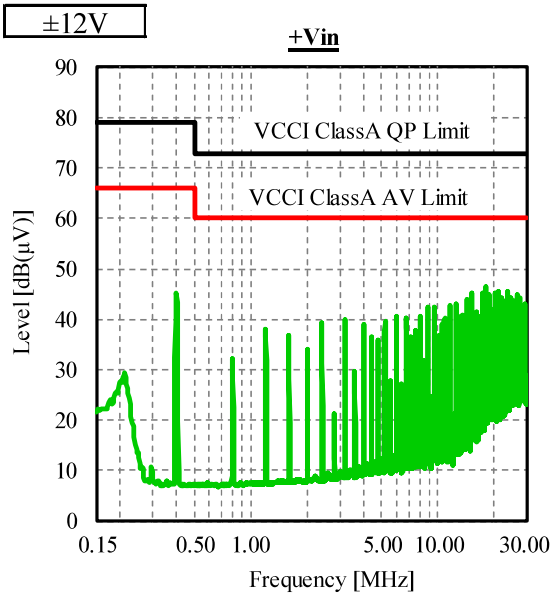


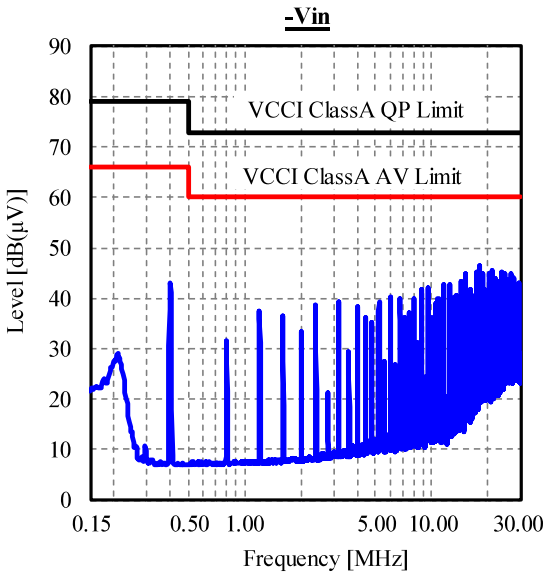
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

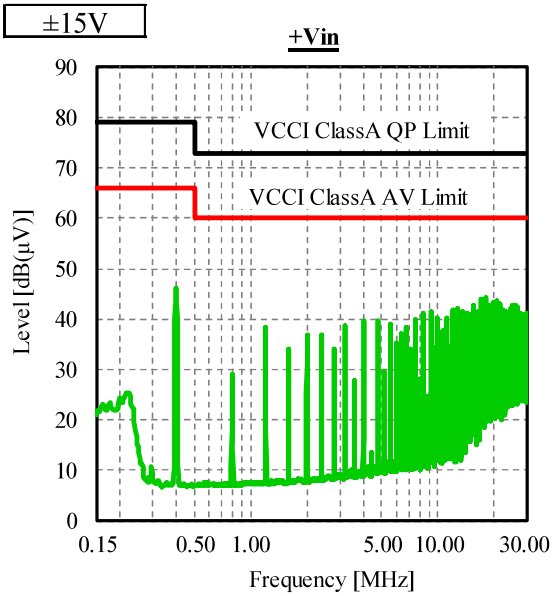
Conditions Vin : 12 VDC
Io : 100 %
Ta : 25 ℃

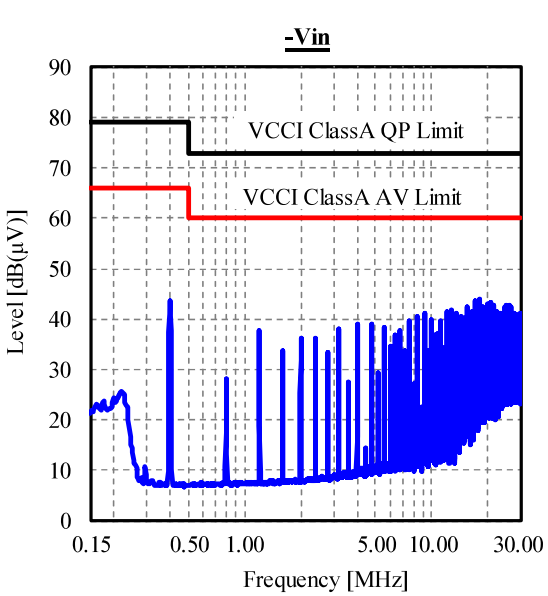
±12V





±15V





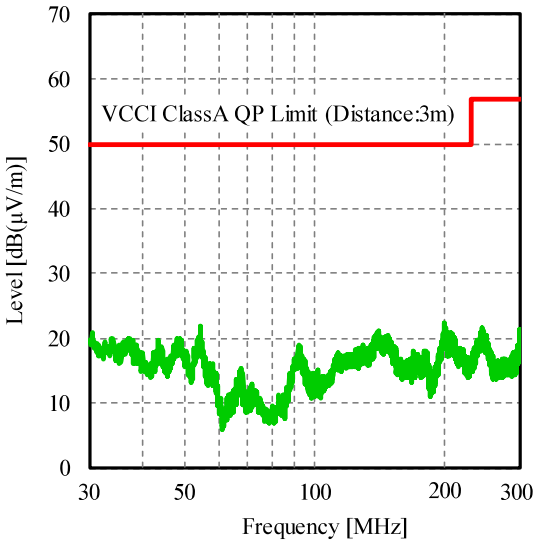
表示はQP値
Indication is QP values.

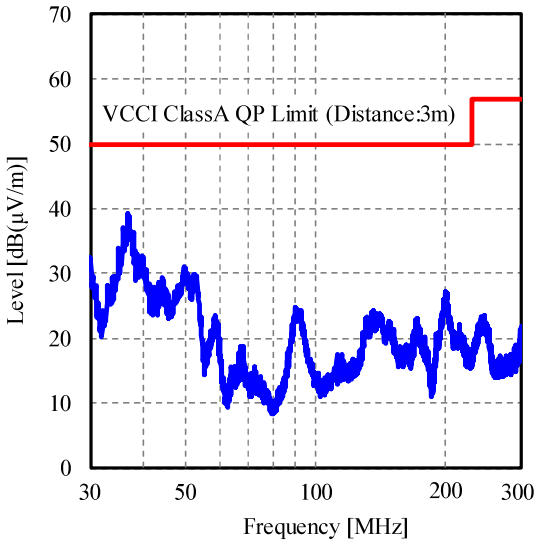
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

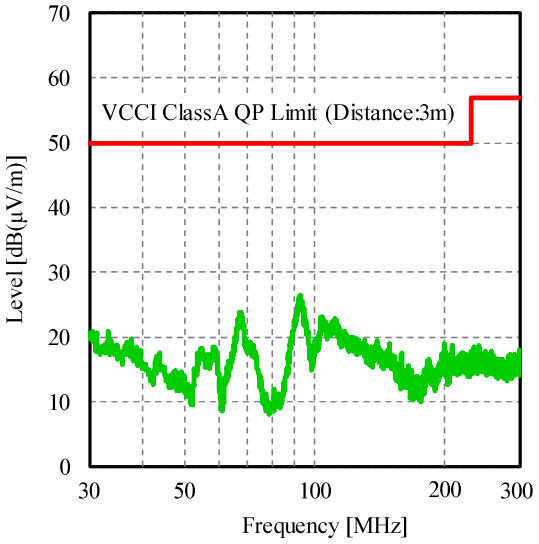
Conditions Vin : 12 VDC
Io : 100 %
Ta : 25 ℃

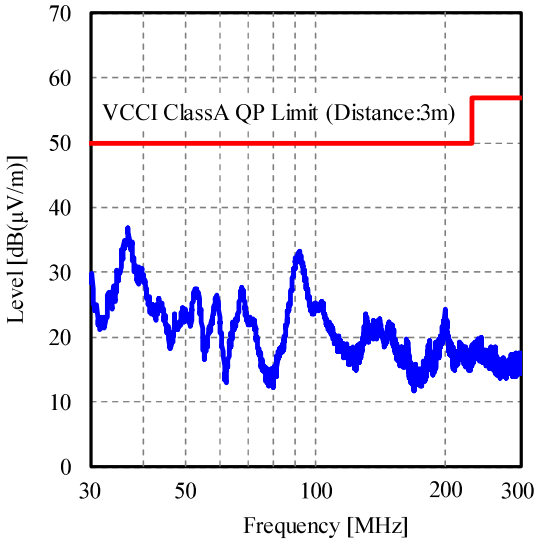
±12V





±15V





表示はピーク値
Indication is peak values.