CCG1R5-48-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

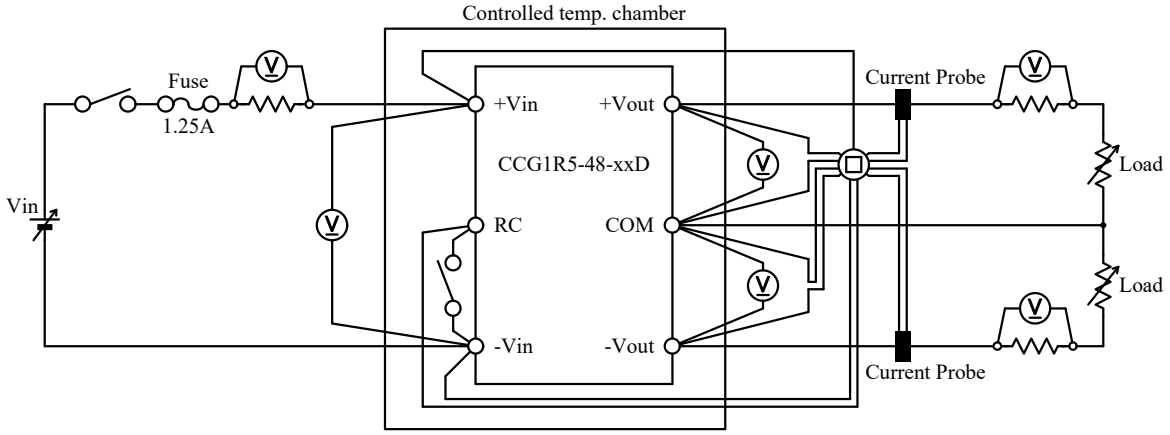
※ 当社測定条件における結果であり、参考値としてお考え願います。
Test results are reference data based on our measurement condition.

1. 測定方法 Evaluation Method

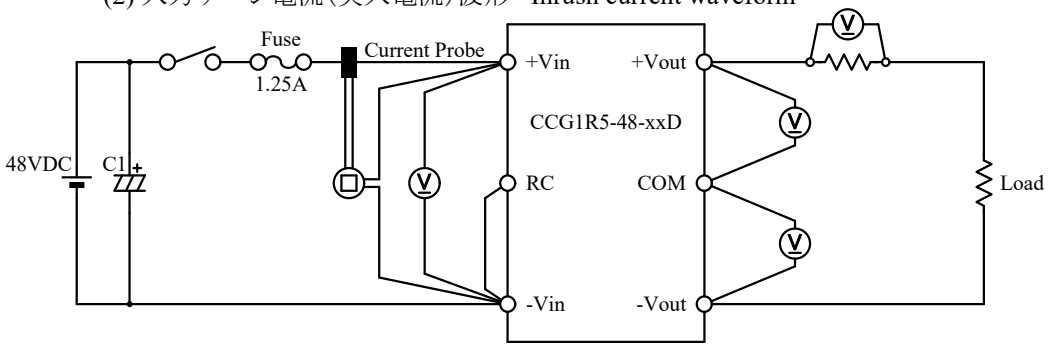
1-1. 測定回路 Measurement Circuits

(1) 静特性 、待機電力特性、通電ドリフト特性、その他特性

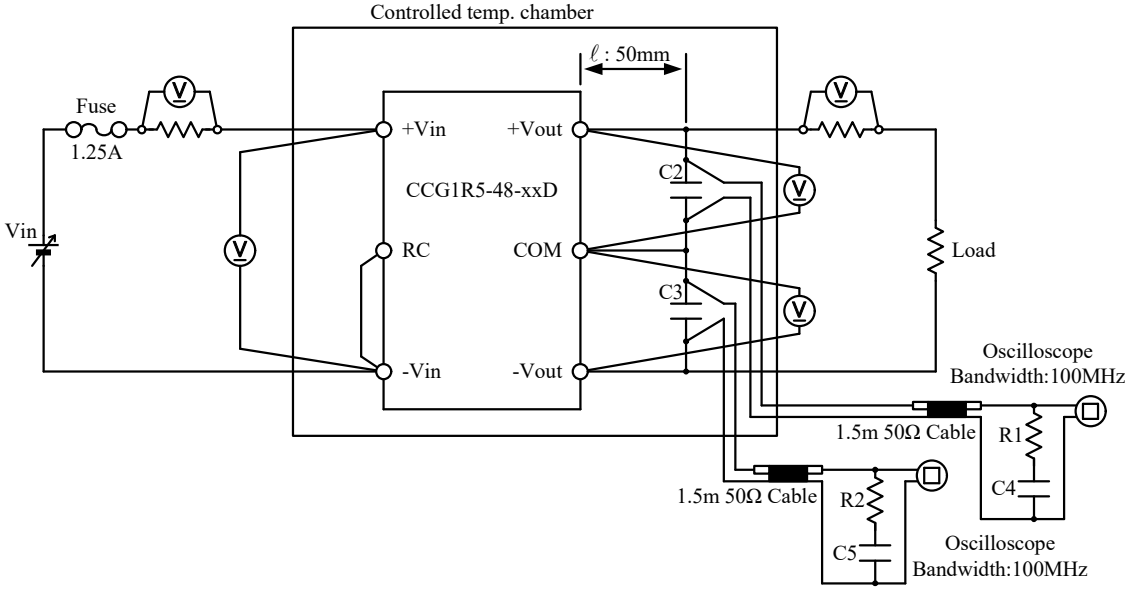
Steady state, Standby power, Warm up voltage drift and Other characteristics



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



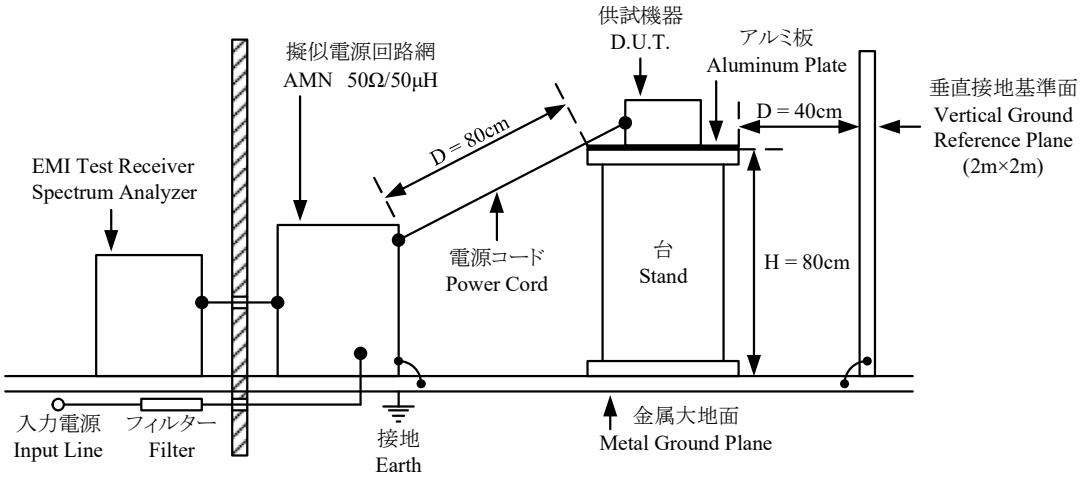
(3) 出力リップルノイズ電圧、波形 Output ripple and noise voltage and waveform



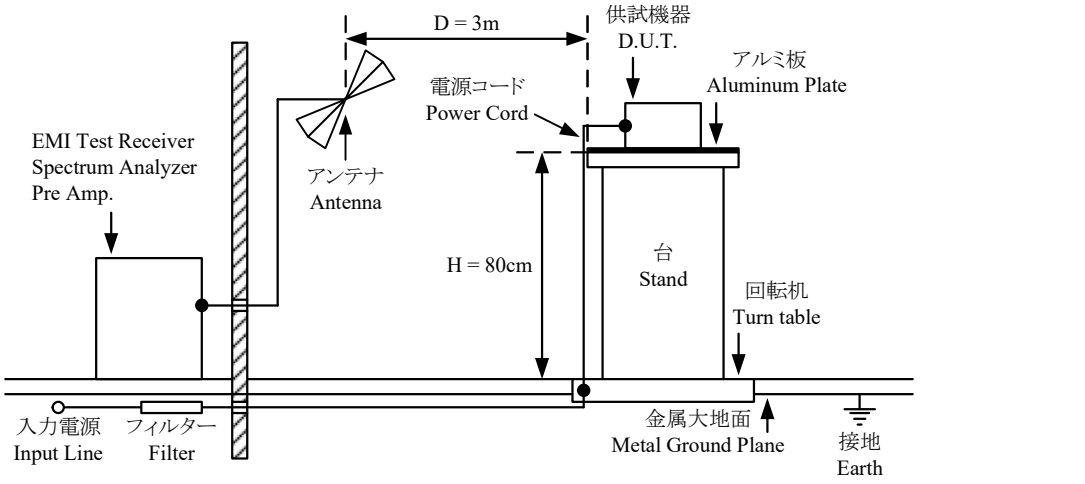
C1	: 4000μF	Electrolytic Capacitor
C2, C3	: 1μF	Ceramic Capacitor
C4, C5	: 4700pF	Ceramic Capacitor
R1, R2	: 50Ω	

(4) EMI特性　Electro-Magnetic Interference characteristics

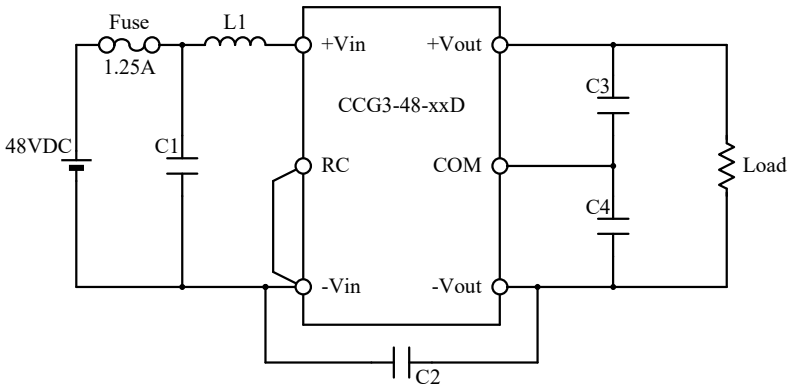
(a) 雑音端子電圧(帰還ノイズ) Conducted Emission Noise



(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	: 100V 2.2μF	Ceramic Capacitor	(C3216X7S2A225K, TDK)
C2	: 2kV 1000pF	Ceramic Capacitor	(C4520X7R3D102K, TDK)
C3	: 25V 10μF	Ceramic Capacitor	(C3216X7R1E106K, TDK)
C4	: 25V 10μF	Ceramic Capacitor	(C3216X7R1E106K, TDK)
L1	: 22μH 650mA	Normal Mode Choke Coil	(LQH32PB220MNC, 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	18VDC	24VDC	48VDC	76VDC	Line regulation	
0%	11.9759V	11.9811V	11.9855V	11.9869V	11.0mV	0.092%
50%(32.5mA)	11.9600V	11.9588V	11.9646V	11.9709V	12.1mV	0.101%
100%(65mA)	11.9622V	11.9595V	11.9607V	11.9663V	6.8mV	0.057%
Load regulation	15.9mV	22.3mV	24.8mV	20.6mV		
	0.132%	0.186%	0.207%	0.172%		

・−Vo

Io \ Vin	18VDC	24VDC	48VDC	76VDC	Line regulation	
0%	-11.9696V	-11.9642V	-11.9600V	-11.9586V	11.0mV	0.092%
50%(32.5mA)	-11.9855V	-11.9867V	-11.9809V	-11.9747V	12.0mV	0.100%
100%(65mA)	-11.9835V	-11.9860V	-11.9849V	-11.9794V	6.6mV	0.055%
Load regulation	15.9mV	22.5mV	24.9mV	20.8mV		
	0.133%	0.188%	0.207%	0.173%		

・+Vo to −Vo

Io \ Vin	18VDC	24VDC	48VDC	76VDC	Line regulation	
0%	23.9455V	23.9453V	23.9455V	23.9455V	0.2mV	0.001%
50%(32.5mA)	23.9456V	23.9455V	23.9455V	23.9456V	0.1mV	0.000%
100%(65mA)	23.9457V	23.9455V	23.9456V	23.9457V	0.2mV	0.001%
Load regulation	0.2mV	0.2mV	0.1mV	0.2mV		
	0.001%	0.001%	0.000%	0.001%		

2. Temperature drift　　Conditions　Vin :　48 VDC
Io :　100 %

Ta	-40°C	25°C	85°C	Temperature stability	
+Vo	11.9294V	11.9607V	11.9345V	31.3mV	0.261%
-Vo	-11.9630V	-11.9849V	-11.9594V	25.5mV	0.212%
+Vo to -Vo	23.8924V	23.9456V	23.8939V	53.2mV	0.222%

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

・+Vo (-Io : 100%)

+Io \ Vin	18VDC	24VDC	48VDC	76VDC
20%(13mA)	12.0700V	12.0608V	12.0608V	12.0771V
100%(65mA)	11.9615V	11.9588V	11.9588V	11.9656V
Load regulation	108.5mV	102.0mV	102.0mV	111.5mV
	0.904%	0.850%	0.850%	0.929%

・−Vo (+Io : 100%)

-Io \ Vin	18VDC	24VDC	48VDC	76VDC
20%(13mA)	-12.0971V	-12.0889V	-12.0889V	-12.0775V
100%(65mA)	-11.9845V	-11.9870V	-11.9870V	-11.9800V
Load regulation	112.6mV	101.9mV	101.9mV	97.5mV
	0.938%	0.849%	0.849%	0.813%

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

・+Vo

Io \ Vin	18VDC	24VDC	48VDC	76VDC	Line regulation	
0%	14.9073V	14.9099V	14.9200V	14.9181V	12.7mV	0.085%
50%(25mA)	14.8665V	14.8777V	14.8853V	14.8911V	24.6mV	0.164%
100%(50mA)	14.8314V	14.8560V	14.8823V	14.8883V	56.9mV	0.379%
Load	75.9mV	53.9mV	37.7mV	29.8mV		
regulation	0.506%	0.359%	0.251%	0.199%		

・−Vo

Io \ Vin	18VDC	24VDC	48VDC	76VDC	Line regulation	
0%	-14.9342V	-14.9320V	-14.9217V	-14.9240V	12.5mV	0.083%
50%(25mA)	-14.9759V	-14.9644V	-14.9568V	-14.9513V	24.6mV	0.164%
100%(50mA)	-15.0111V	-14.9864V	-14.9596V	-14.9540V	57.1mV	0.381%
Load	76.9mV	54.4mV	37.9mV	30.0mV		
regulation	0.513%	0.363%	0.253%	0.200%		

・+Vo to −Vo

Io \ Vin	18VDC	24VDC	48VDC	76VDC	Line regulation	
0%	29.8415V	29.8419V	29.8416V	29.8421V	0.6mV	0.002%
50%(25mA)	29.8424V	29.8421V	29.8421V	29.8424V	0.3mV	0.001%
100%(50mA)	29.8425V	29.8424V	29.8420V	29.8423V	0.5mV	0.002%
Load	1.0mV	0.5mV	0.5mV	0.3mV		
regulation	0.003%	0.002%	0.002%	0.001%		

2. Temperature drift Conditions Vin : 48 VDC
Io : 100 %

Ta	-40°C	25°C	85°C	Temperature stability	
+Vo	14.8403V	14.8823V	14.8582V	42.0mV	0.280%
-Vo	-14.9258V	-14.9596V	-14.9289V	33.8mV	0.225%
+Vo to -Vo	29.7661V	29.8420V	29.7872V	75.9mV	0.253%

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

・+Vo (-Io : 100%)

+Io \ Vin	18VDC	24VDC	48VDC	76VDC
20%(10mA)	14.9677V	14.9682V	14.9682V	14.9746V
100%(50mA)	14.8311V	14.8560V	14.8560V	14.8880V
Load	136.6mV	112.2mV	112.2mV	86.6mV
regulation	0.911%	0.748%	0.748%	0.577%

・−Vo (+Io : 100%)

-Io \ Vin	18VDC	24VDC	48VDC	76VDC
20%(10mA)	-15.1088V	-15.0848V	-15.0848V	-15.0659V
100%(50mA)	-15.0115V	-14.9864V	-14.9864V	-14.9543V
Load	97.3mV	98.4mV	98.4mV	111.6mV
regulation	0.649%	0.656%	0.656%	0.744%

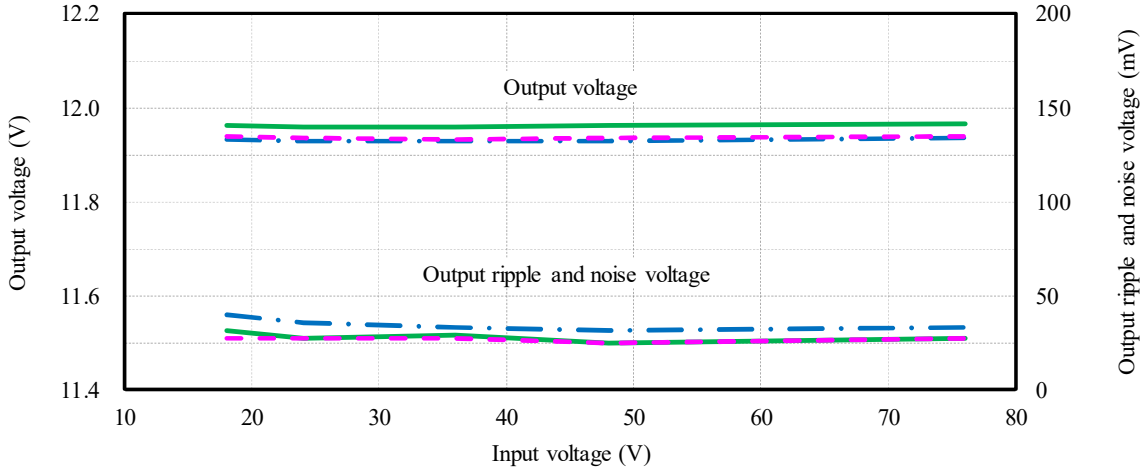
(2) 出力電圧・出力リップルノイズ電圧 対 入力電圧

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

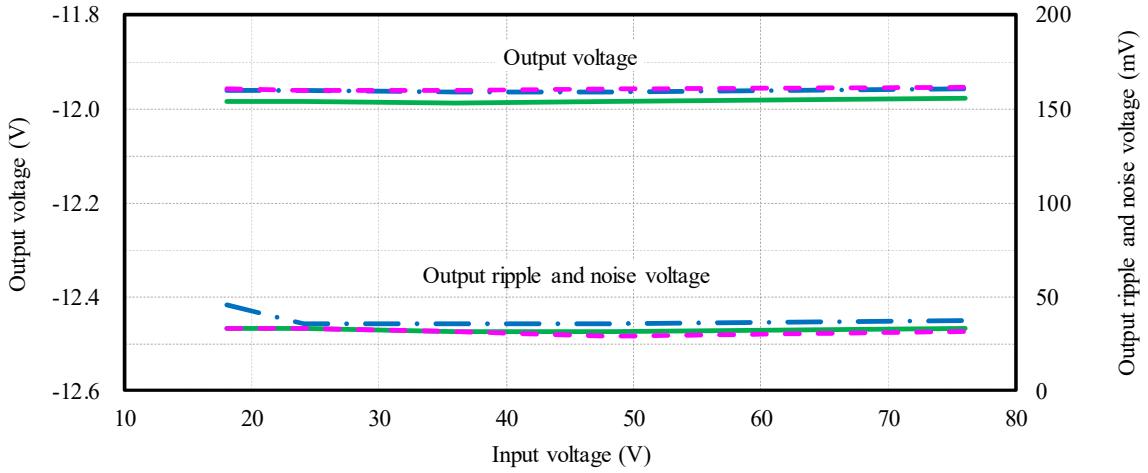
Conditions Io : 100 %
Ta : -40 °C
: 25 °C
: 85 °C

±12V

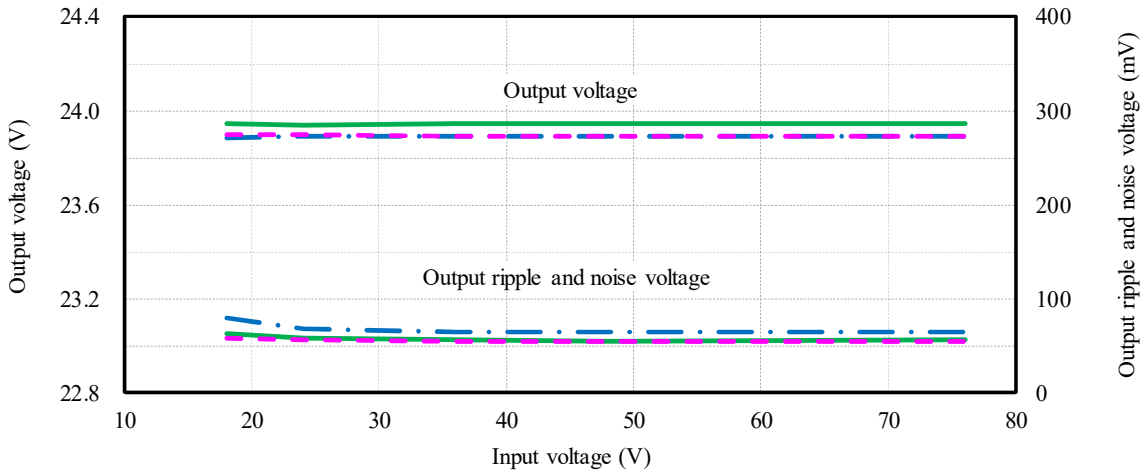
・+Vo



・−Vo



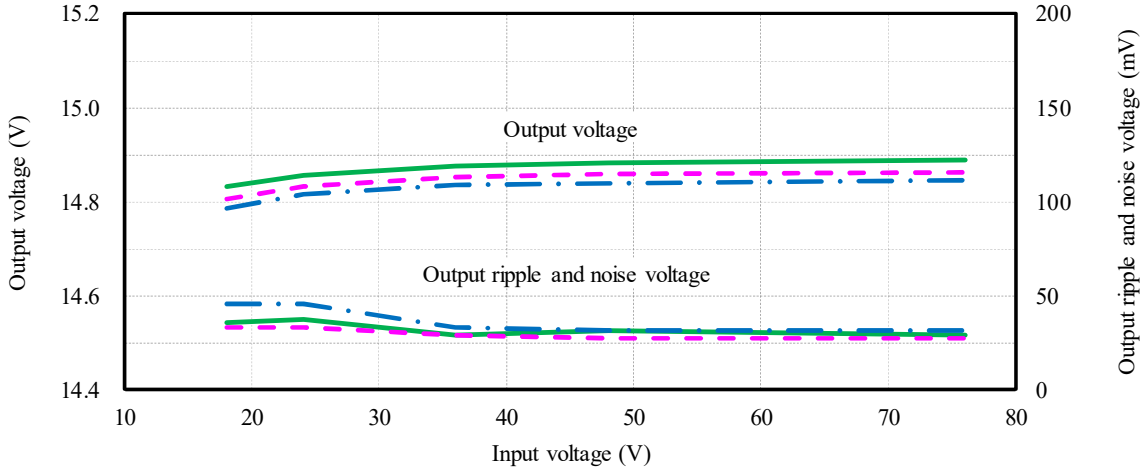
・+Vo to -Vo



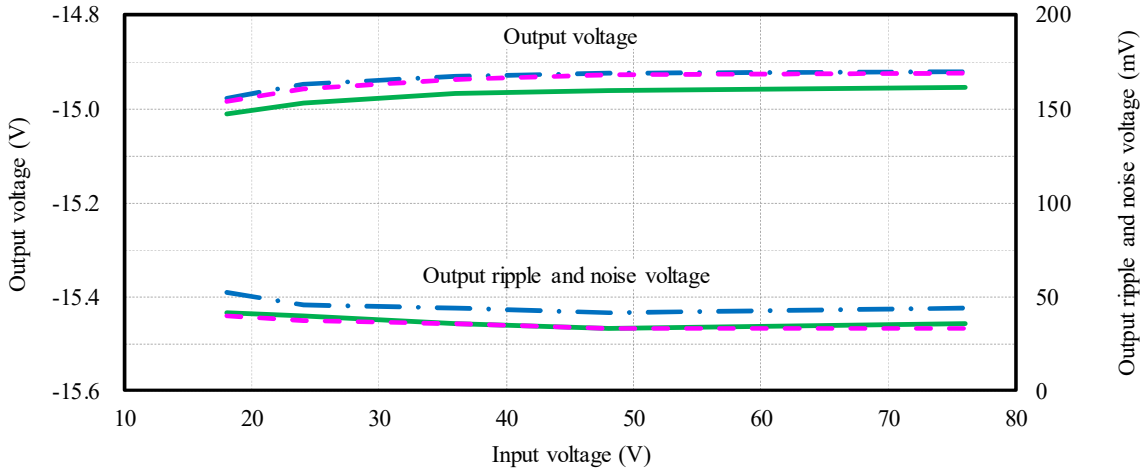
Conditions Io : 100 %
Ta : -40 °C
: 25 °C
: 85 °C

±15V

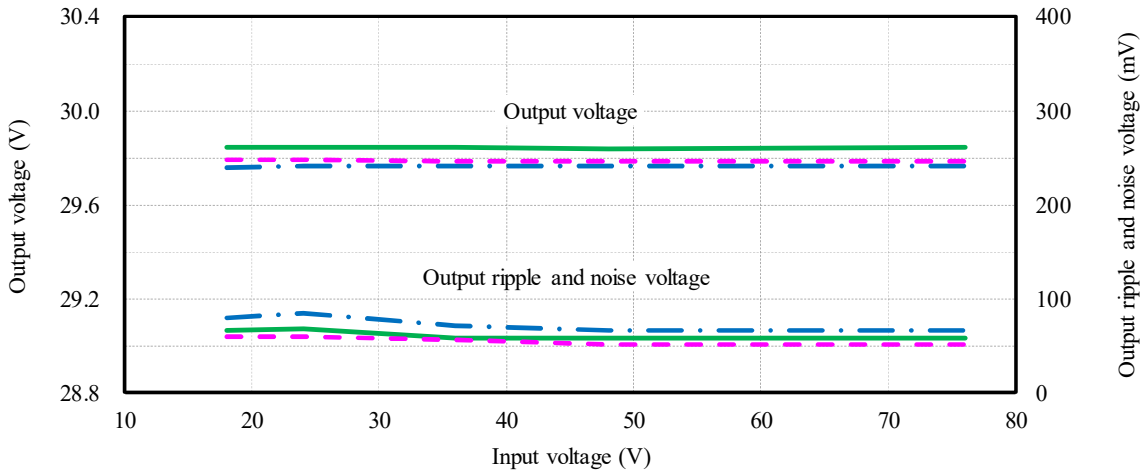
・+Vo



・−Vo



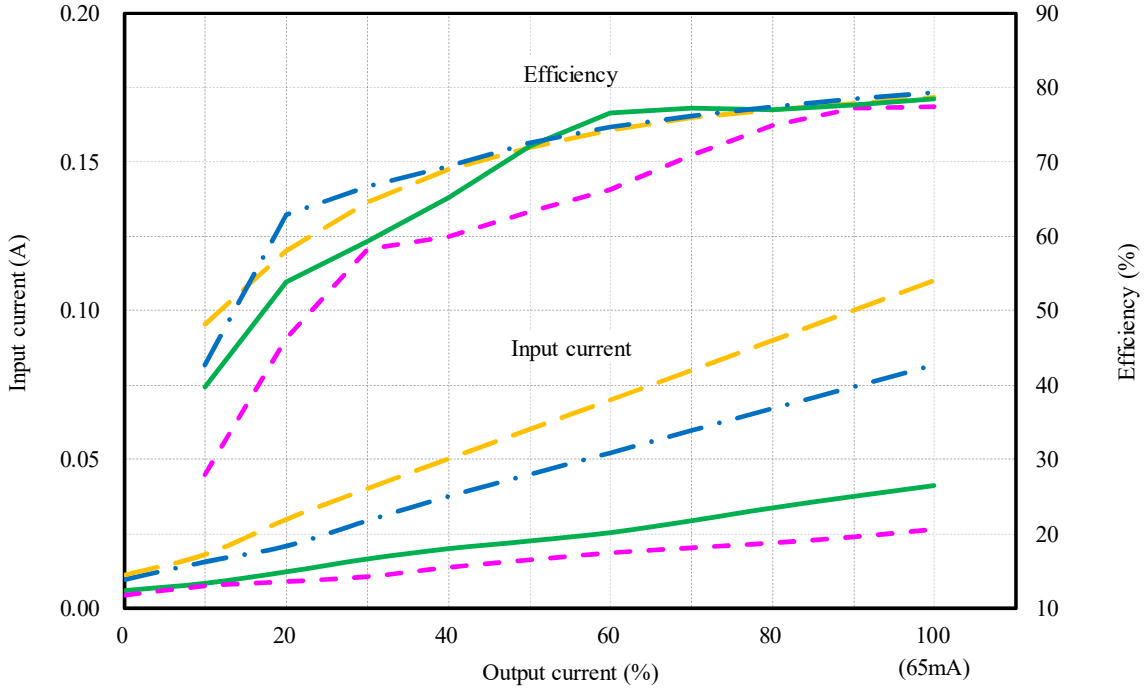
・+Vo to -Vo



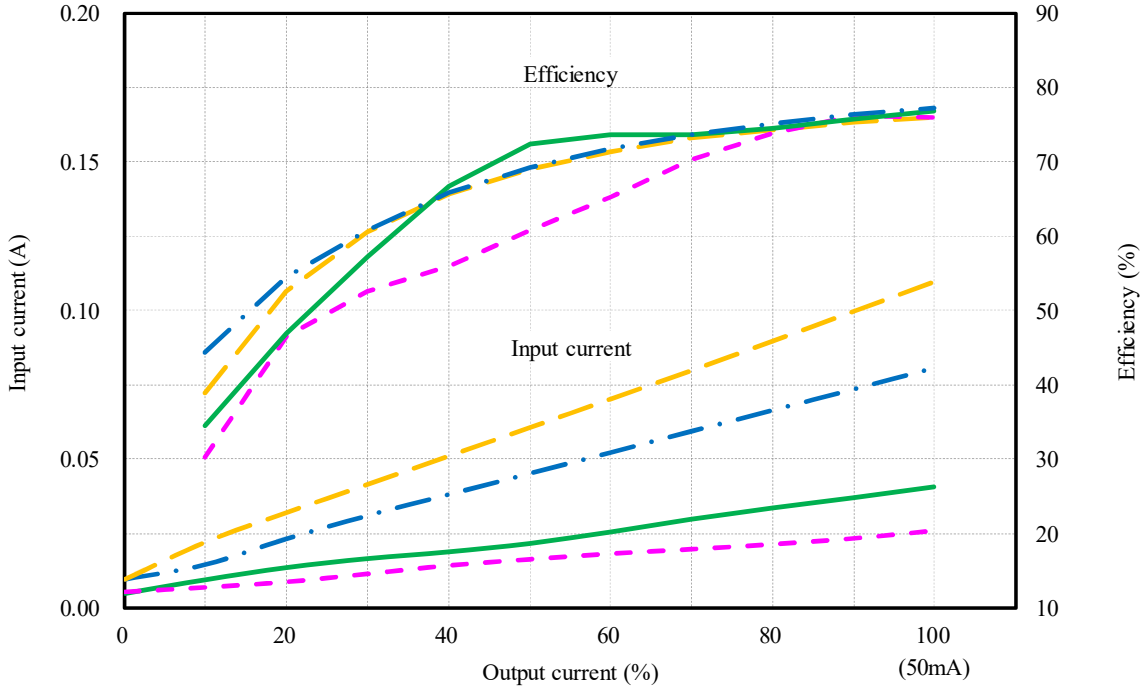
(3) 入力電流･効率 対 出力電流 Input current and Efficiency vs. Output current

Conditions Vin : 18 VDC
: 24 VDC
: 48 VDC
: 76 VDC
Ta : 25 °C

±12V



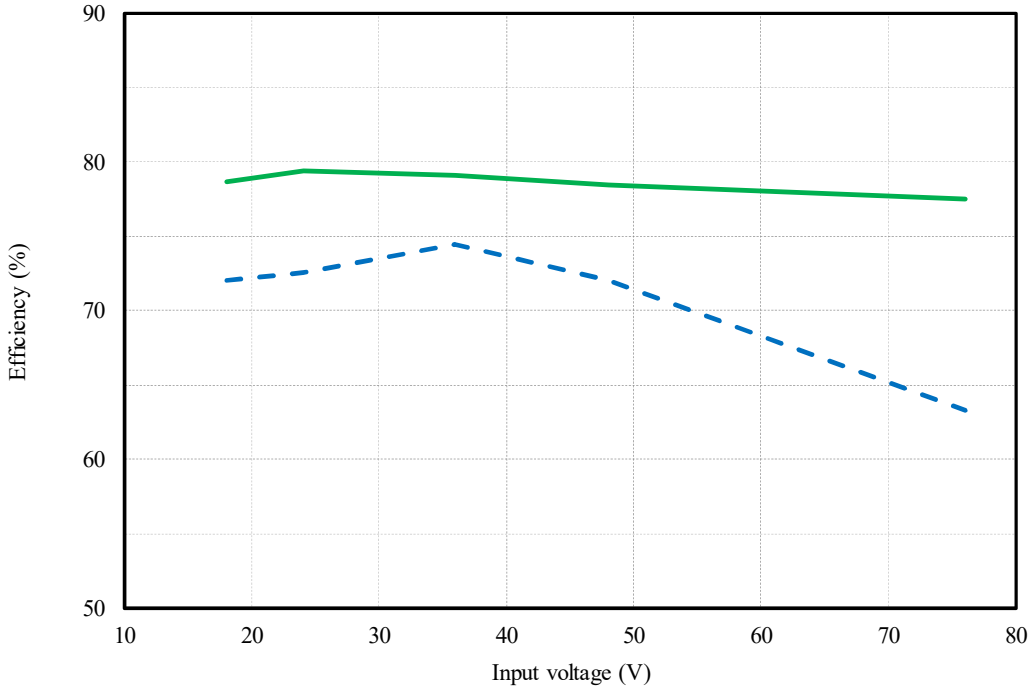
±15V



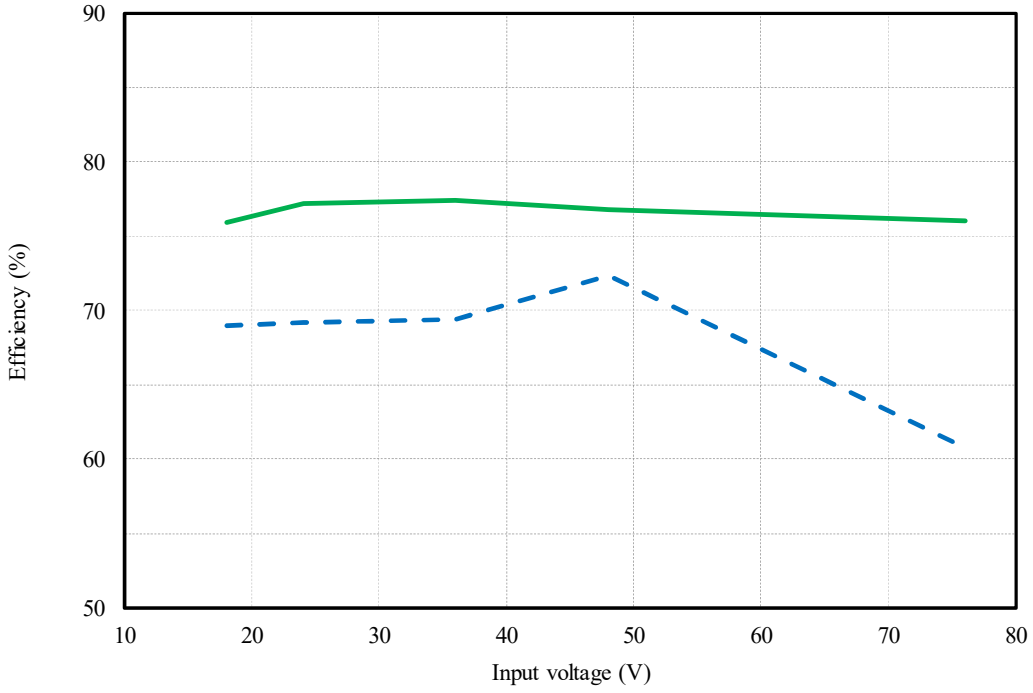
(4) 効率 対 入力電圧 Efficiency vs. Input voltage

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

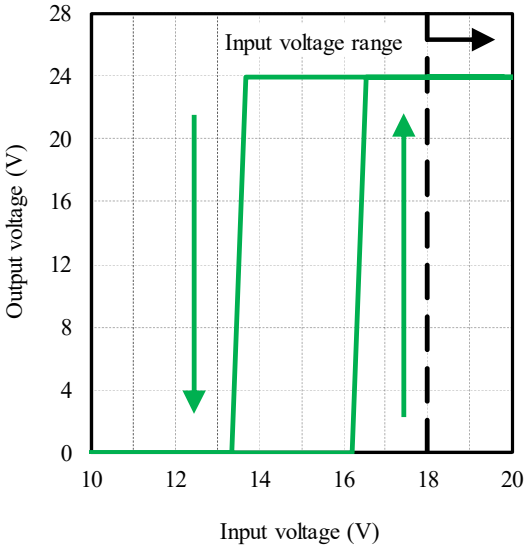
出力電圧 対 入力電圧
Output voltage vs. Input voltage

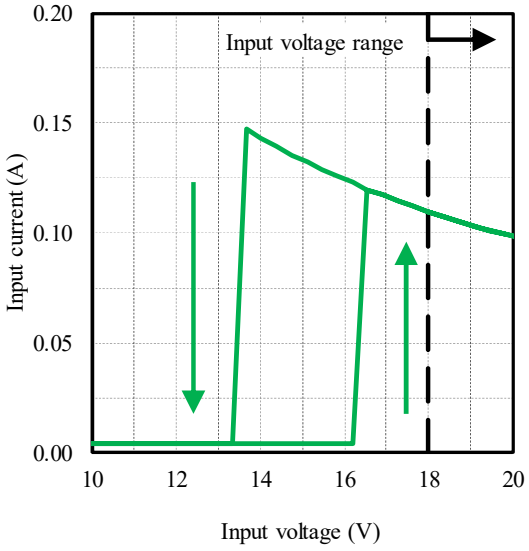
Conditions Io : 100 %
Ta : 25 °C

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

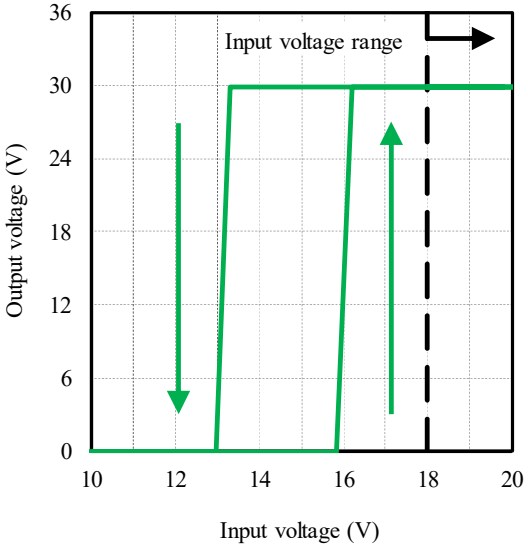
Conditions Io : 100 %
Ta : 25 °C

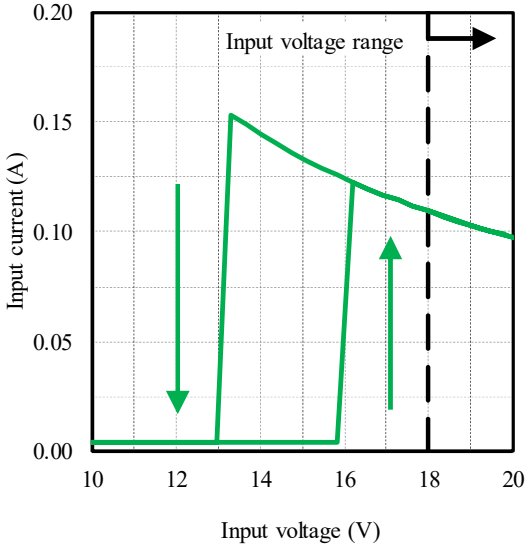
±12V





±15V

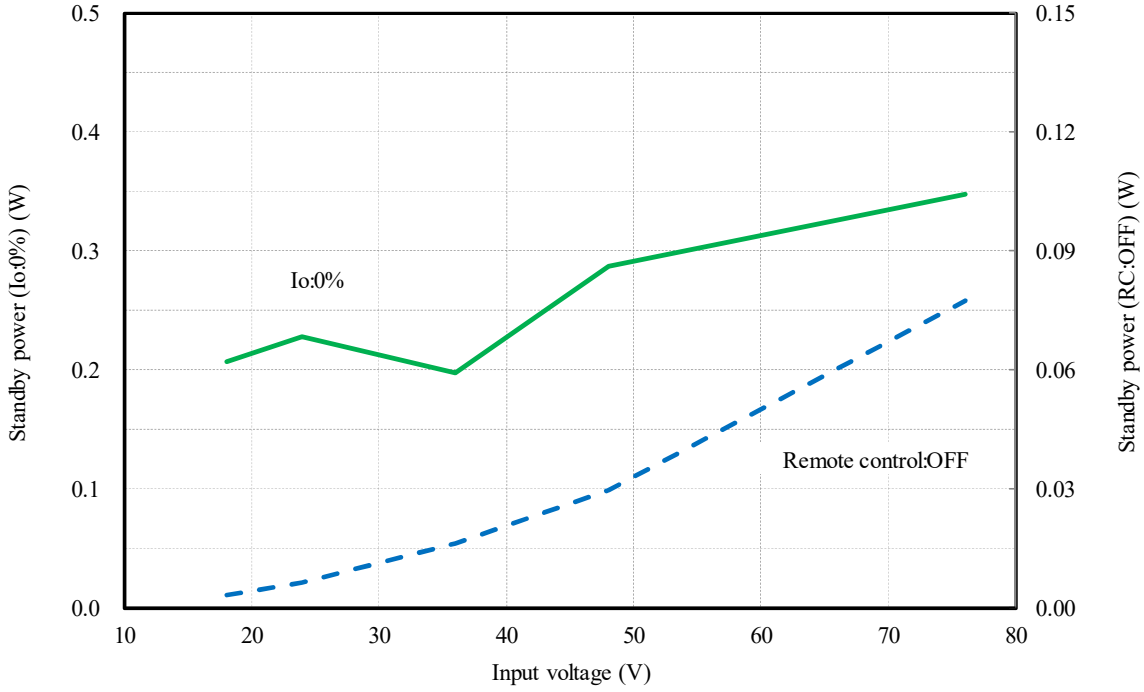




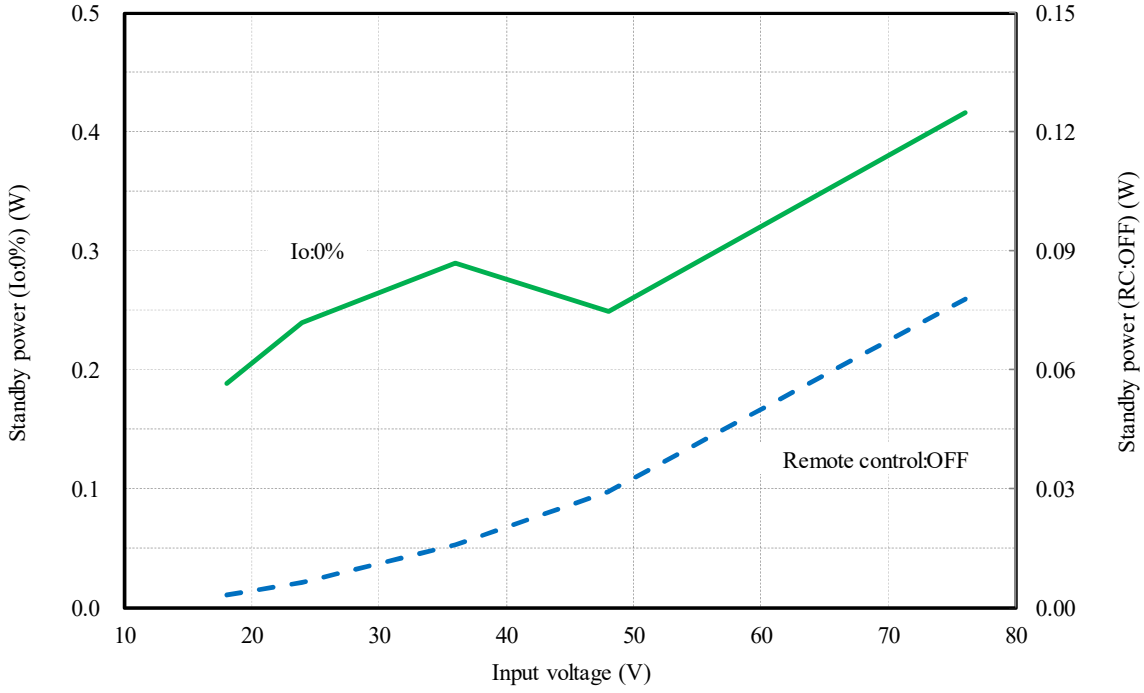
2-2. 待機電力特性 Standby power characteristics

Condition Ta : 25 °C

±12V



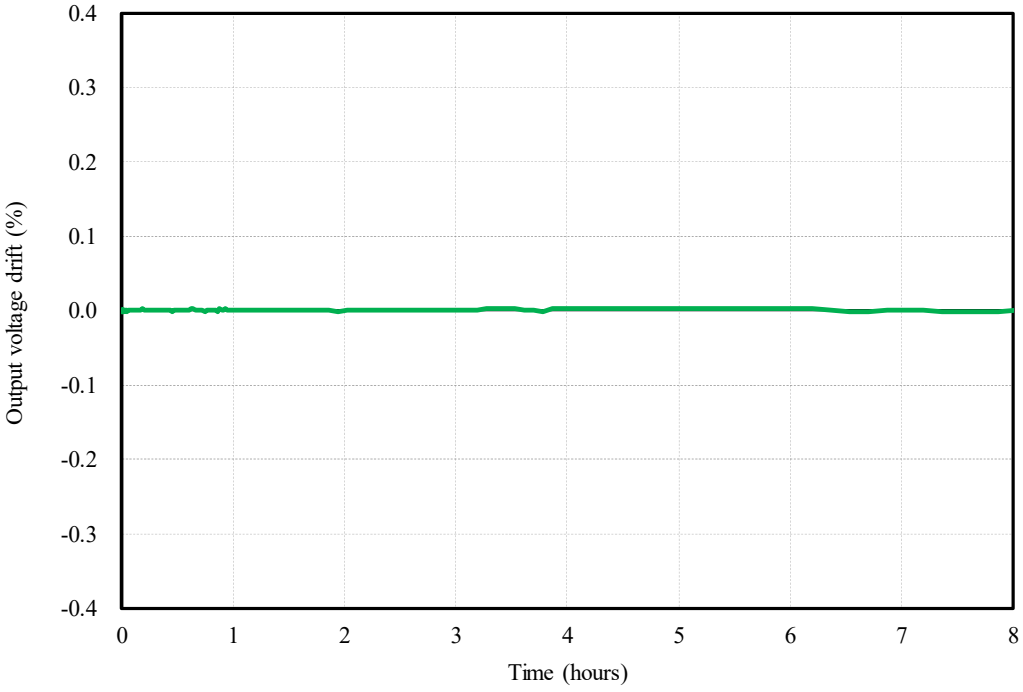
±15V



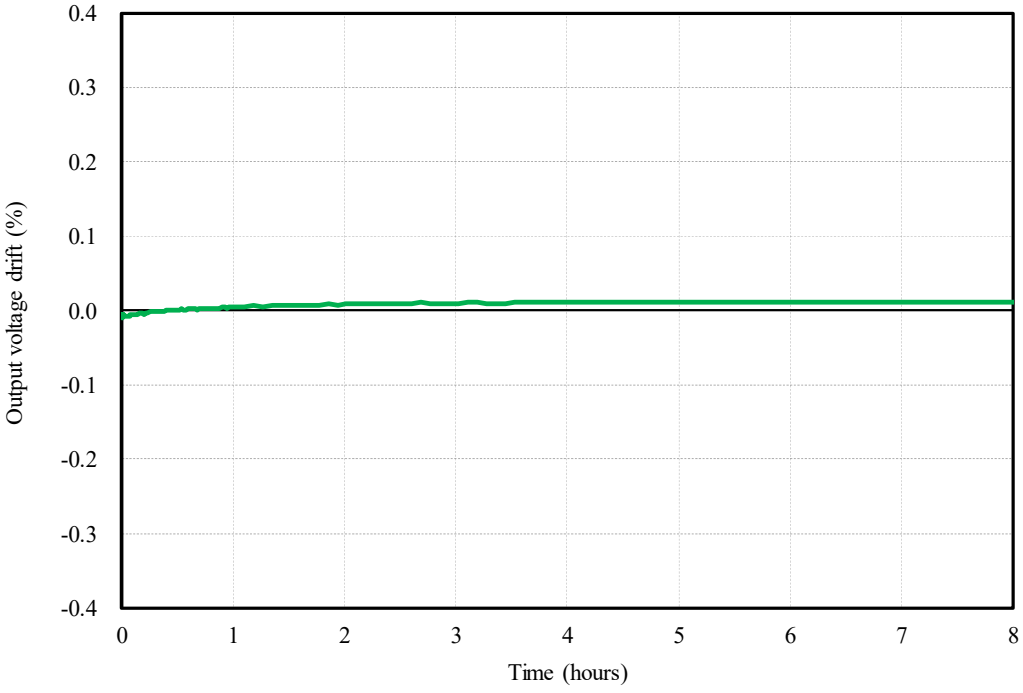
2-3. 通電ドリフト特性 Warm up voltage drift characteristics

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

±12V



±15V



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

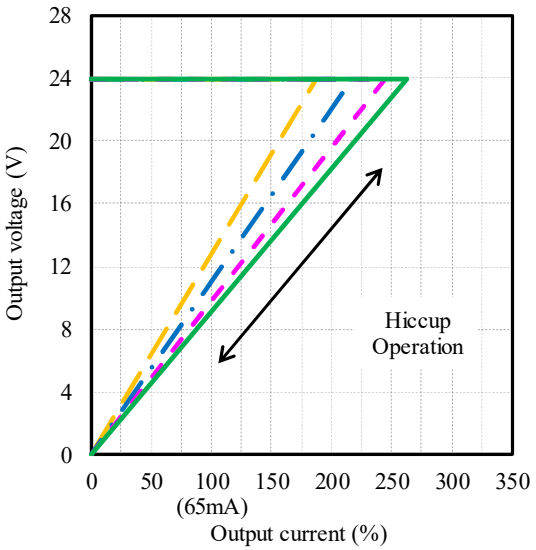
入力電圧依存性
Input voltage dependence

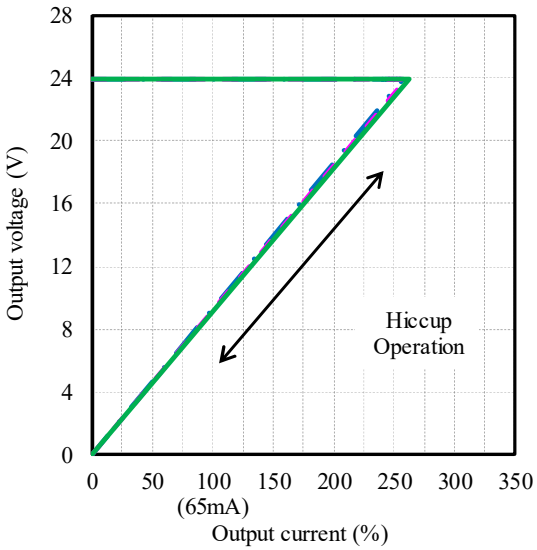
Conditions Vin : 18 VDC
: 24 VDC
: 48 VDC
: 76 VDC
Ta : 25 °C

周囲温度依存性
Ambient temperature dependence

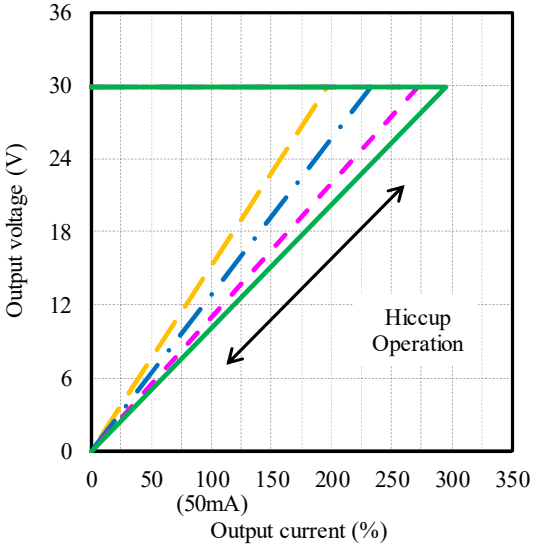
Conditions Vin : 48 VDC
Ta : -40 °C
: 25 °C
: 85 °C

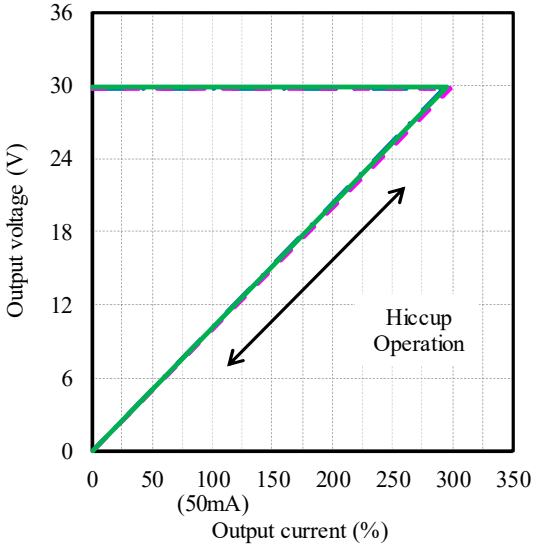
±12V





±15V

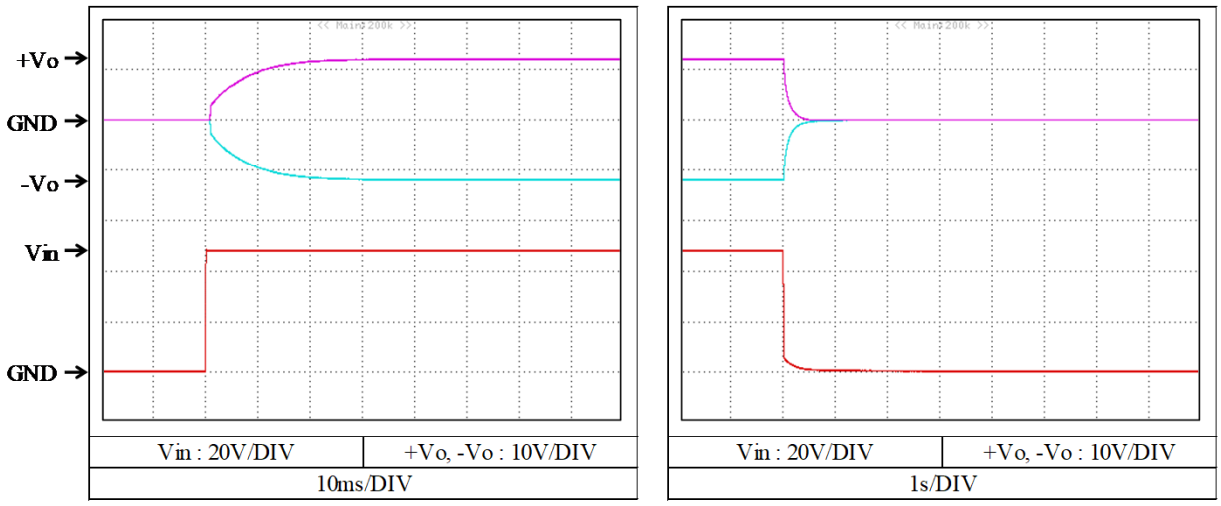




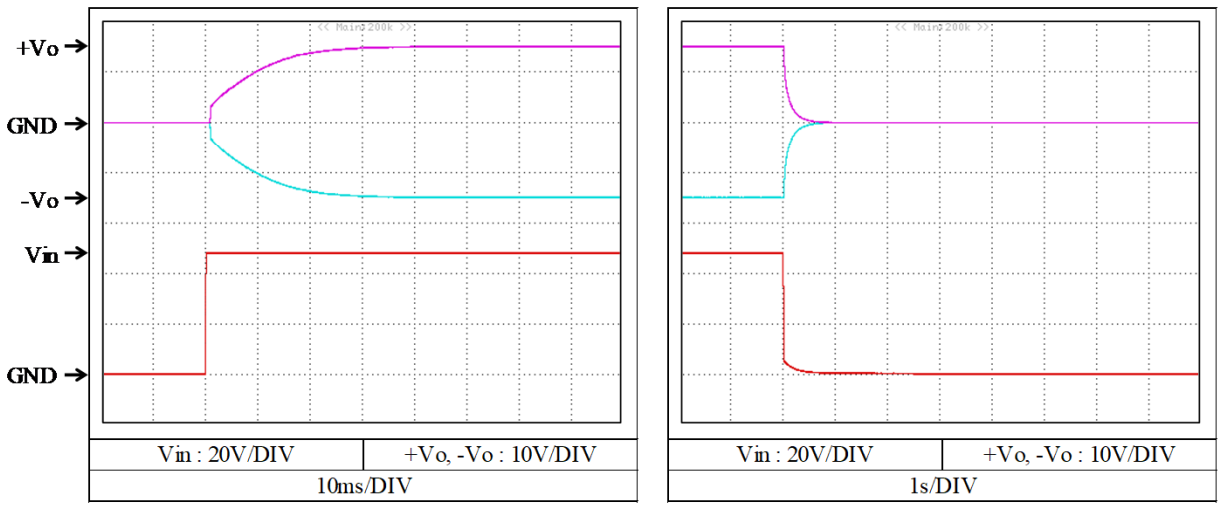
2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

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

±12V



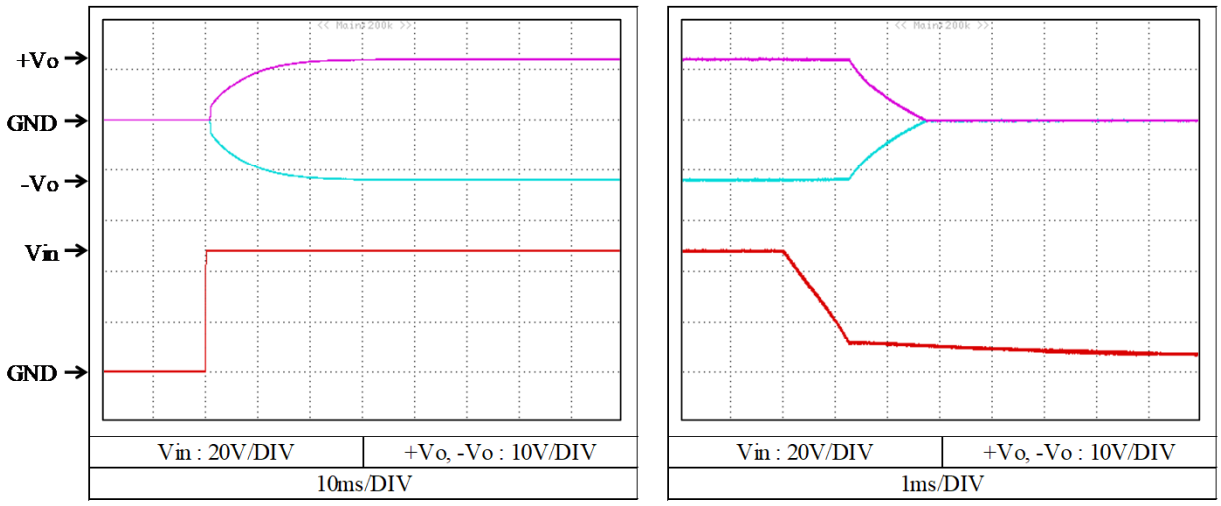
+15V



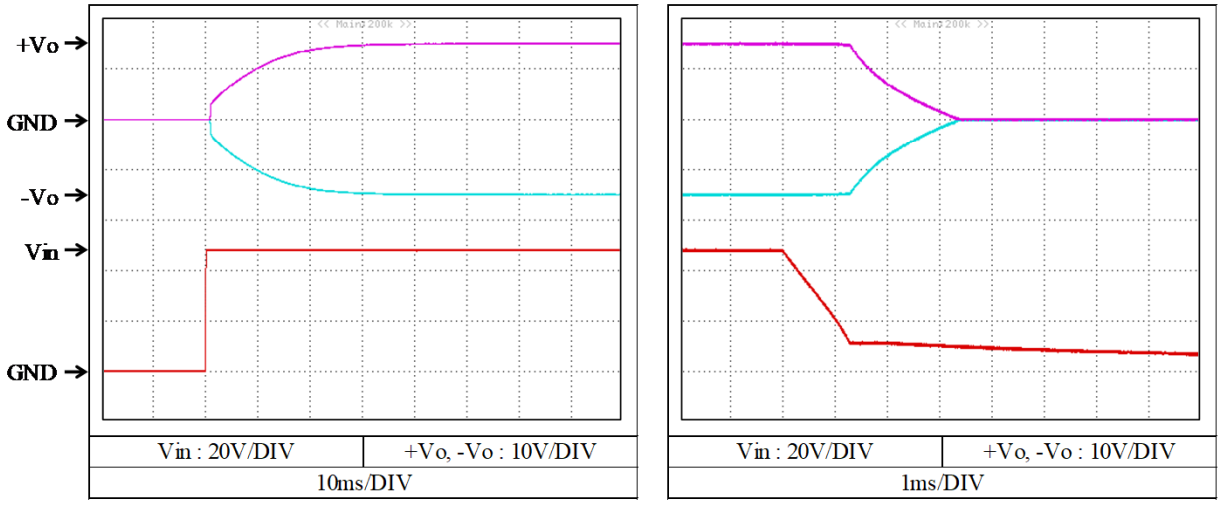
2-5. 出力立ち上がり・立ち下がり特性 Output rise and fall characteristics

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

±12V



+15V

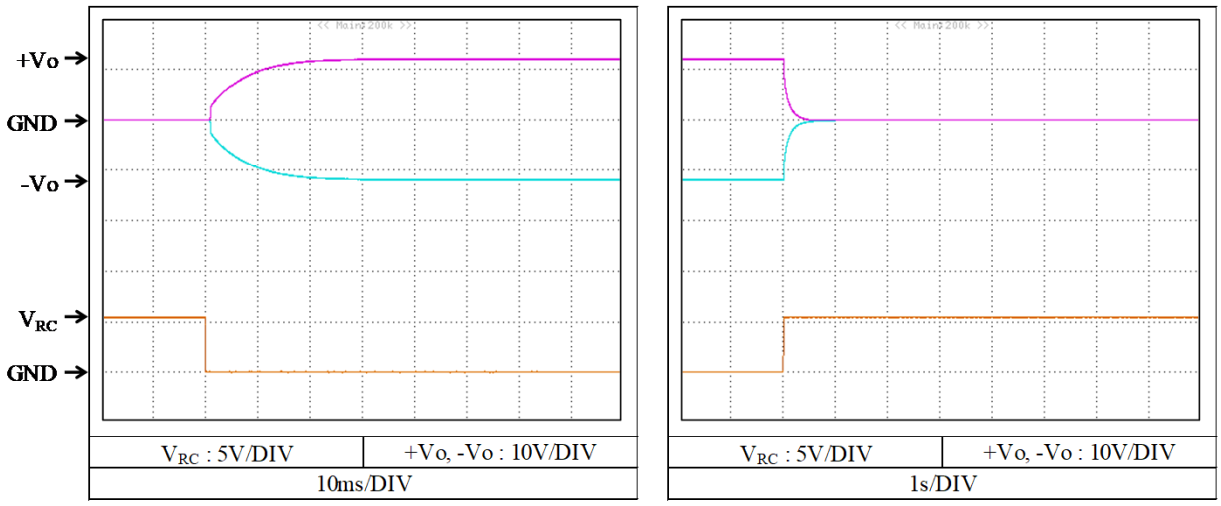


2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

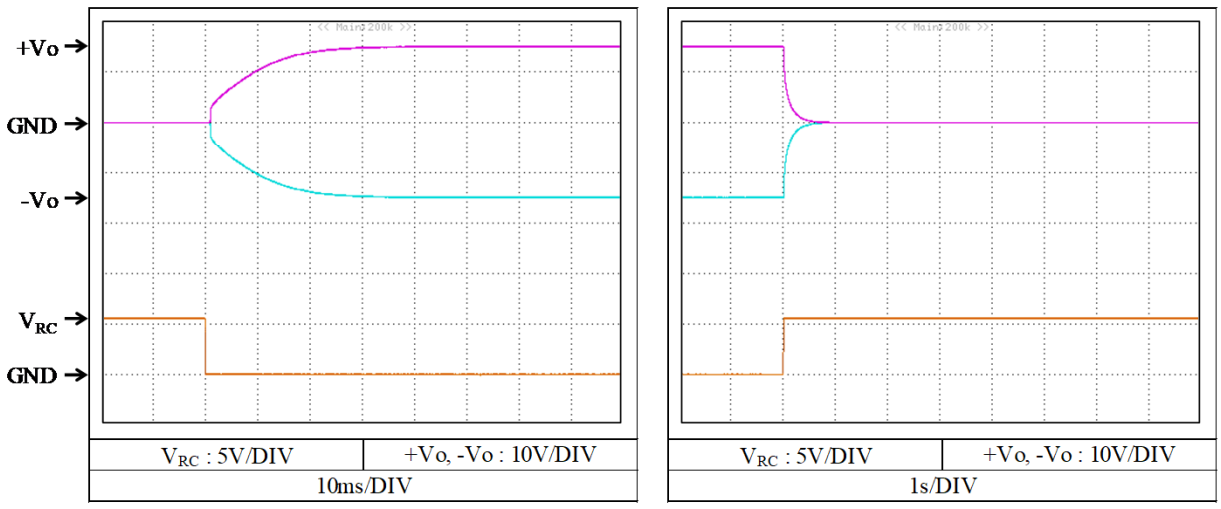
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

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

±12V



+15V

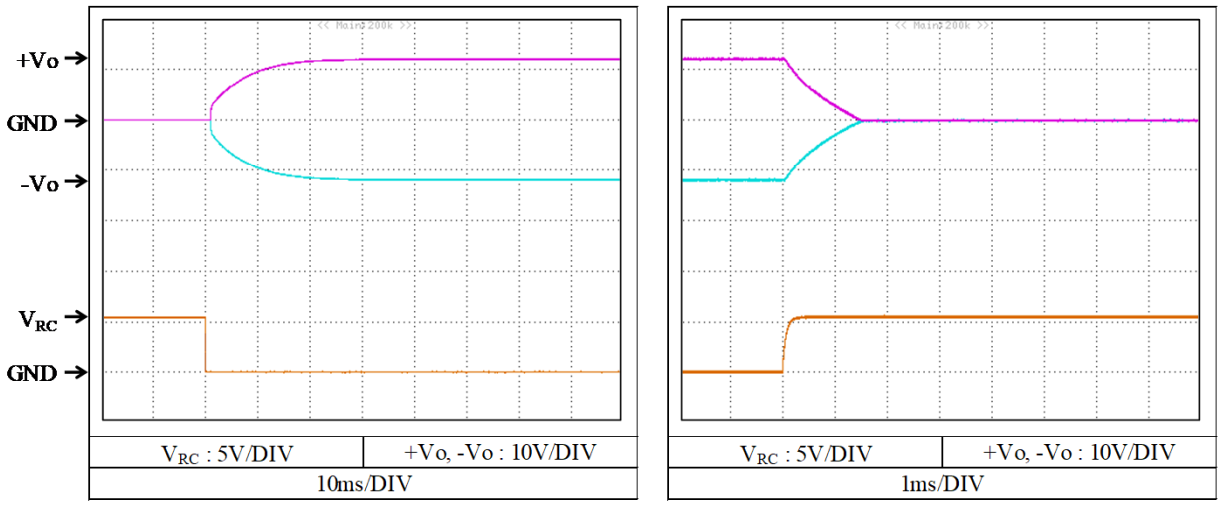


2-5. 出力立ち上がり・立ち下がり特性 (リモートON/OFFコントロール時)

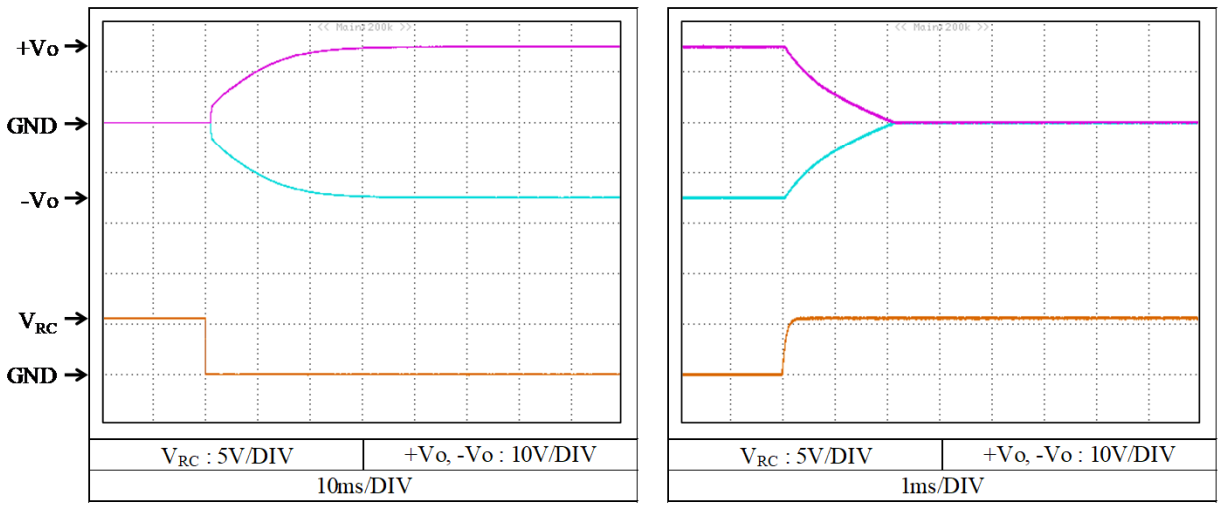
Output rise and fall characteristics with REMOTE ON/OFF CONTROL

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

±12V



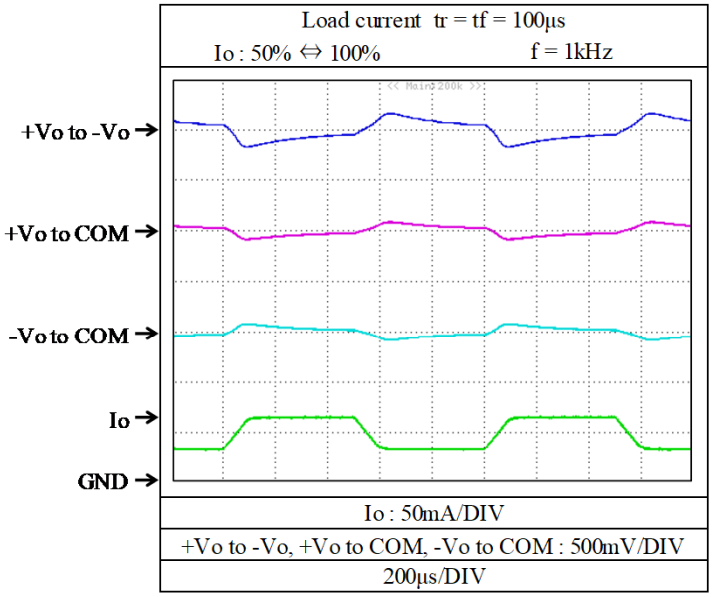
+15V



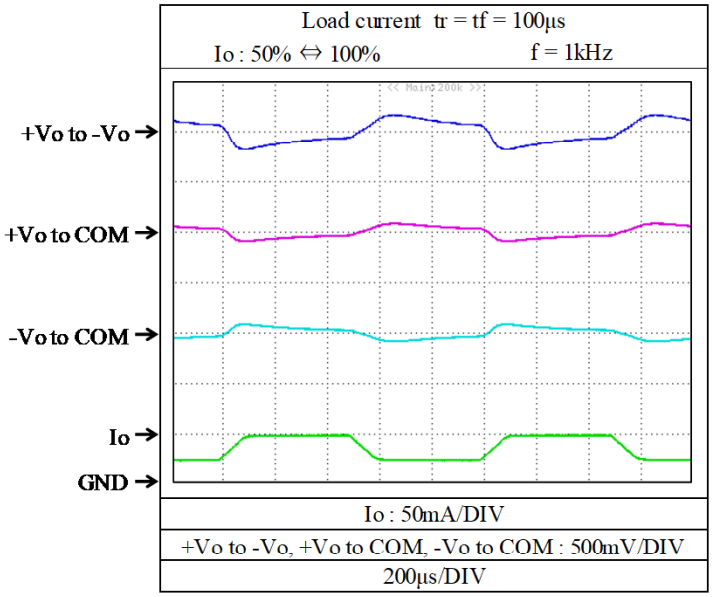
2-6. 過渡応答(負荷急変)特性 Dynamic load response characteristics

Conditions Vin : 48 VDC
Ta : 25 °C

±12V



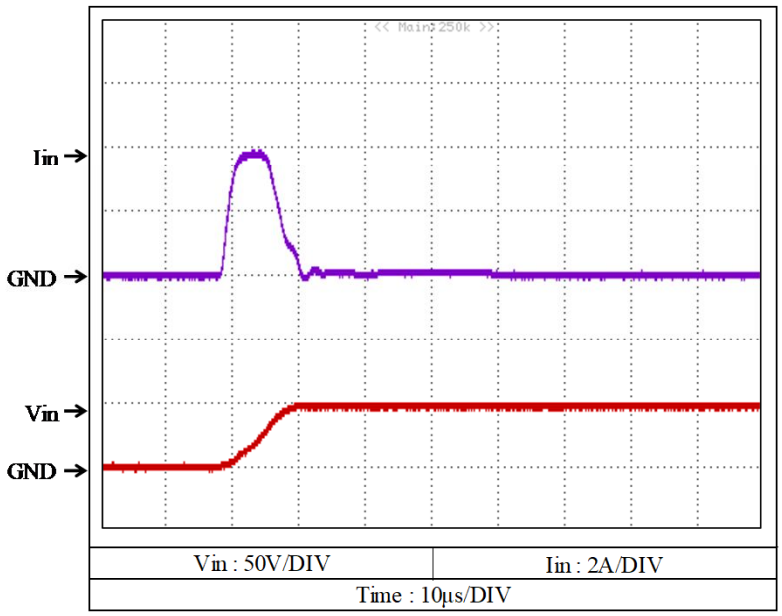
+15V



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

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

CCG3-48-05S

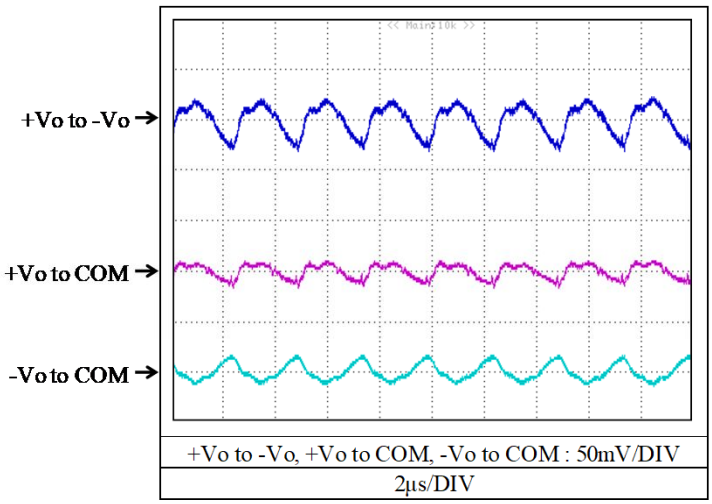


CCG1R5-48-xxDの入力サージ電流特性は CCG3-48-05S と同等です。
CCG1R5-48-xxD have the same Inrush current characteristics as CCG3-48-05S data.

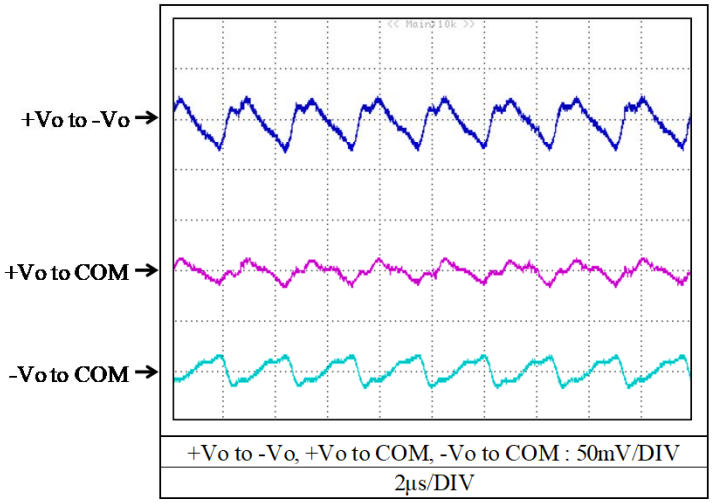
2-8. 出力リップルノイズ波形 Output ripple and noise waveform

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

±12V



+15V

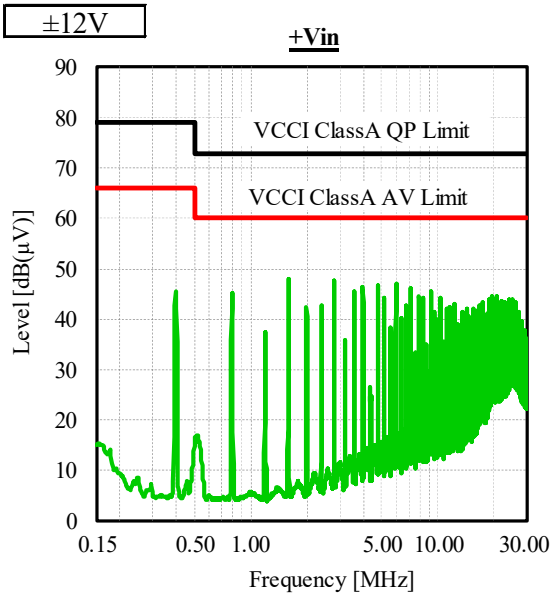


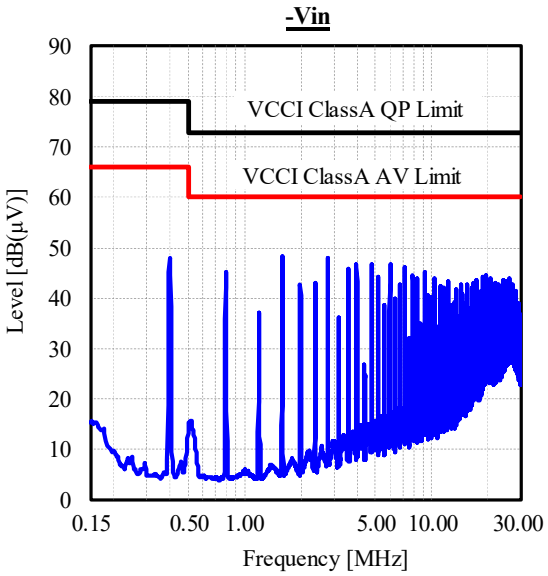
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

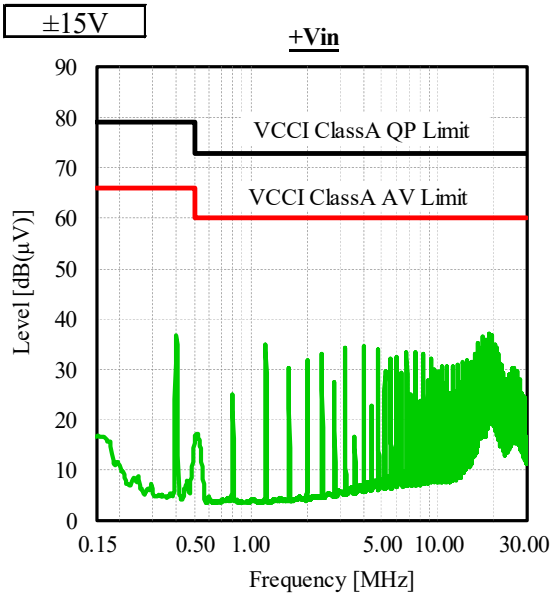
Conditions Vin : 48 VDC
Io : 100 %
Ta : 25 ºC

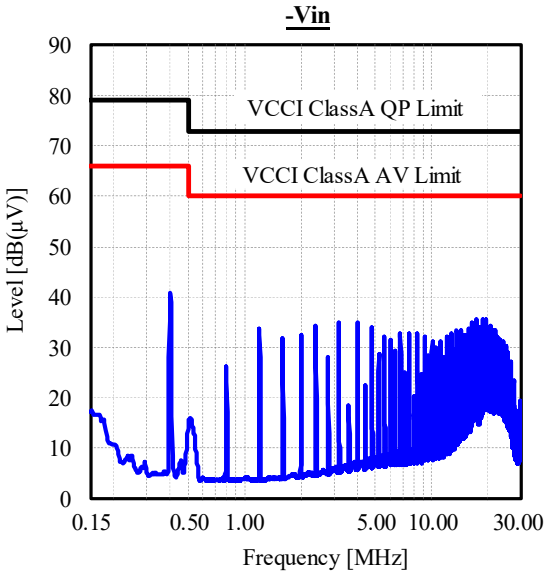
±12V





±15V





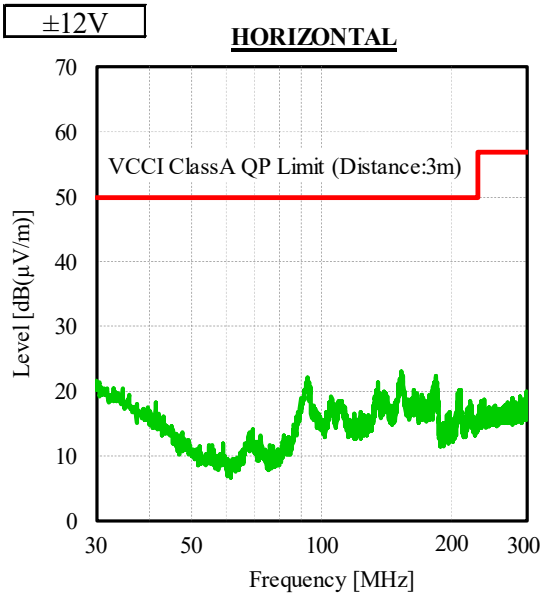
表示はQP値
Indication is QP values.

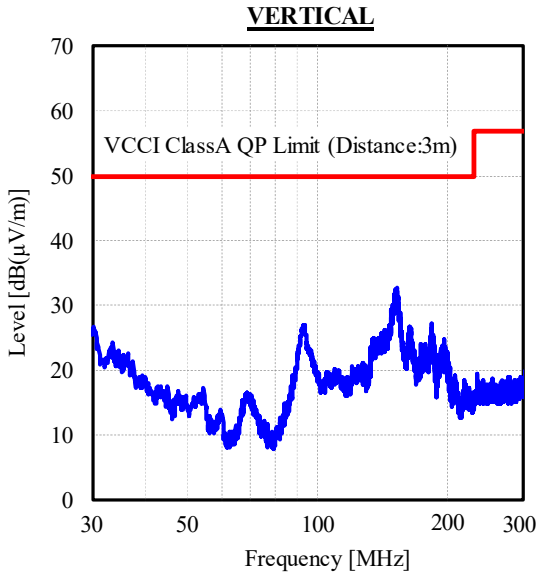
2-9. EMI特性 Electro-Magnetic Interference characteristics

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

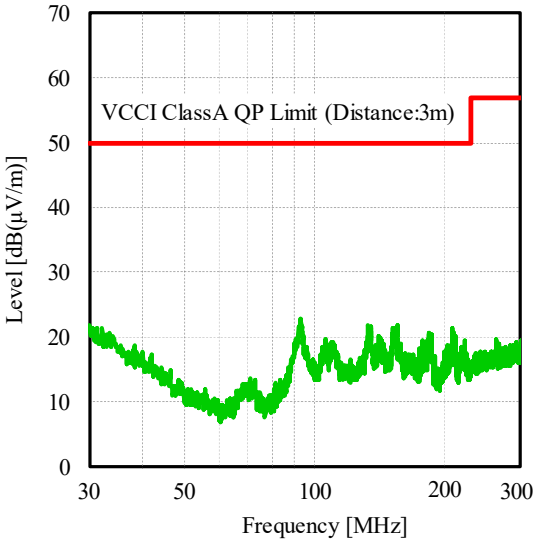
Conditions Vin : 48 VDC
Io : 100 %
Ta : 25 ºC

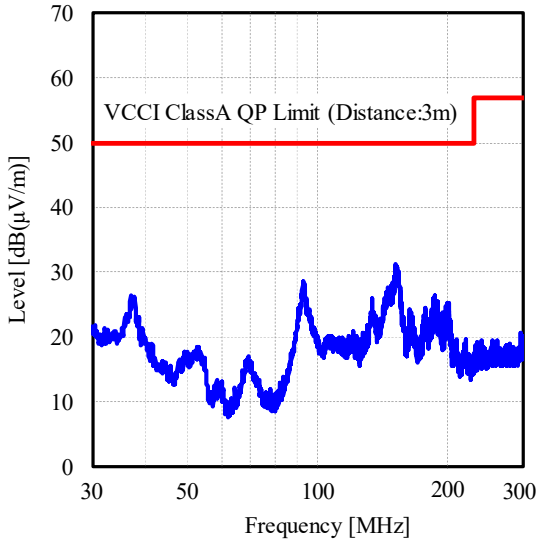
±12V





±15V





表示はピーク値
Indication is peak values.