

TEP200-280

EVALUATION DATA

型式データ

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使用記号 Terminology used

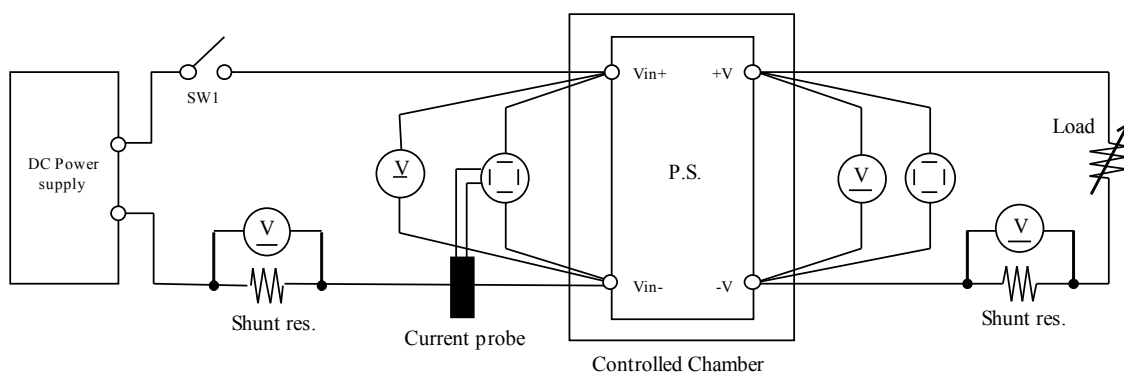
	定義	Definition
Vin 入力電圧	Input voltage
Vout 出力電圧	Output voltage
Iin 入力電流	Input current
Iout 出力電流	Output current
Ta 周囲温度	Ambient temperature

1. 測定方法 Evaluation Method

1-1. 測定回路 Circuit used for determination

測定回路1 Circuit 1 used for determination

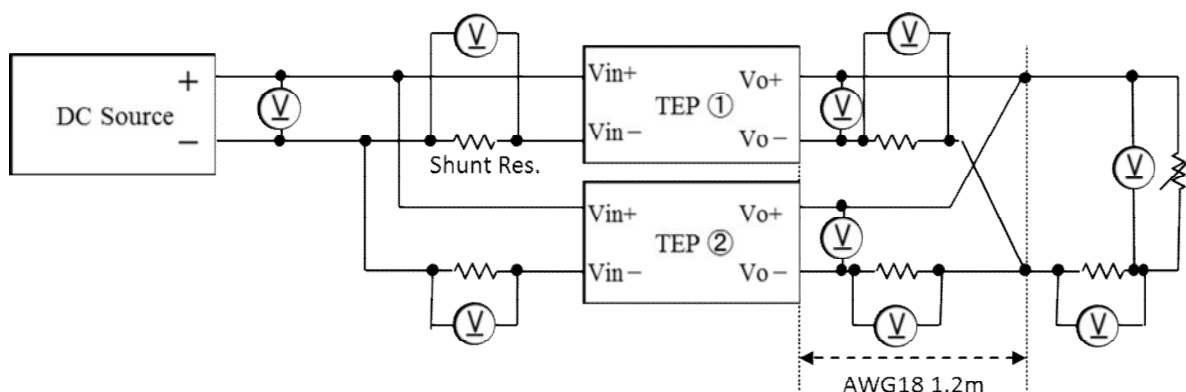
- 静特性 Steady state data
- 通電ドリフト特性 Warm up voltage drift characteristics *1)
- 出力立ち上がり特性 Output rise characteristics
- 出力立ち下がり特性 Output fall characteristics
- 過電流保護特性 Over current protection (OCP) characteristics
- 過電圧保護特性 Over voltage protection (OVP) characteristics
- 過渡応答(負荷急変)特性 Dynamic load response characteristics
- 入力サージ電流(突入電流)波形 Inrush current waveform
- 出力リップル/ノイズ波形 Output ripple and noise waveform
- 入力緩変 Input voltage slow up/slow down



*1) 恒温槽使用せず。 Without Controlled Chamber, in open air.

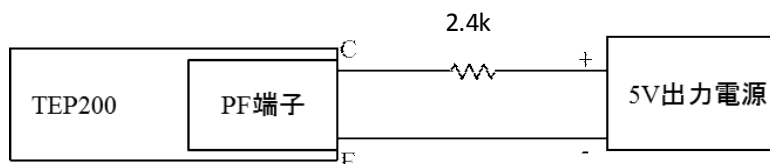
測定回路2 Circuit 2 used for determination

- 並列運転 Parallel operation



測定回路3 Circuit 3 used for determination

- PF信号出力 Power Fail signal



1-2. 使用測定機器 List of equipment used

No.	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	CONTROLLED TEMP. CHAMBER	ESPEC	SU-240
2	DIGITAL MULTIMETER	Keysight	34970A
3	SHUNT RESISTER	YOKOGAWA ELECT.	2215(1A)
4	SHUNT RESISTER	YOKOGAWA ELECT.	2215(1A)
5	DYNAMIC DUMMY LOAD	KIKUSUI	PLZ1003WH
6	DC POWER SUPPLY	TDK-Lambda	GEN600-2.6
7	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DL1740
8	DIGITAL STORAGE OSCILLOSCOPE	YOKOGAWA ELECT.	DL9040L

2. 特性データ Characteristics

2.1 静特性 Steady state data

(1) 入力・負荷・温度変動／出力起動・遮断電圧

Regulation - line and load, Temperature drift / Start up voltage and Drop out voltage

1. Regulation - line and load

Condition Ta : 25 °C

Iout \ Vin	300VDC	450VDC	650VDC	850VDC	1000VDC	line regulation	
0A	284.4V	284.9V	285.1V	285.3V	285.2V	969mV	0.35%
0.35A	282.1V	282.2V	282.4V	282.6V	282.4V	511mV	0.18%
0.7A	-	279.9V	280.0V	280.2V	280.1V	355mV	0.13%
load regulation	2276mV	5007mV	5075mV	5094mV			
	0.81%	1.79%	1.81%	1.82%			

2. Temperature drift

Conditions Vin : 650 VDC

Ta	-20 °C	+25 °C	+60 °C	temperature stability	
Vout	284.9V	280.0V	276.9V	7967mV	2.85%

Iout : 0.7 A

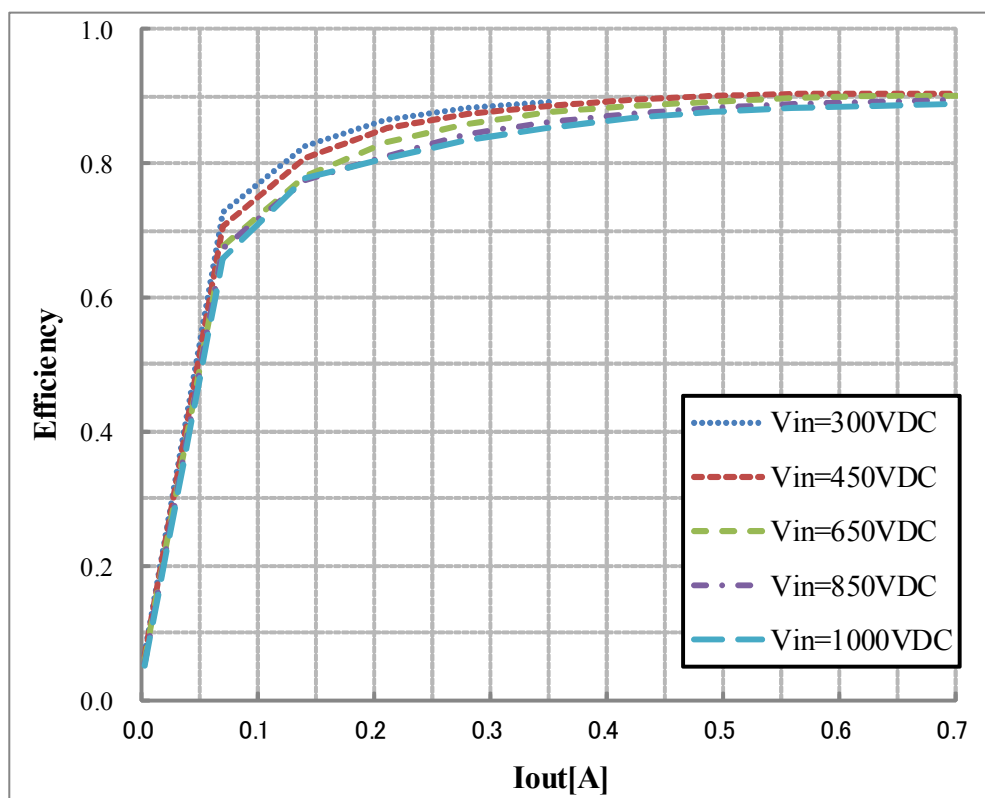
3. Start up voltage and Drop out voltage

Conditions Ta : 25 °C

Start up voltage (Vin)	284VDC
Drop out voltage (Vin)	277VDC

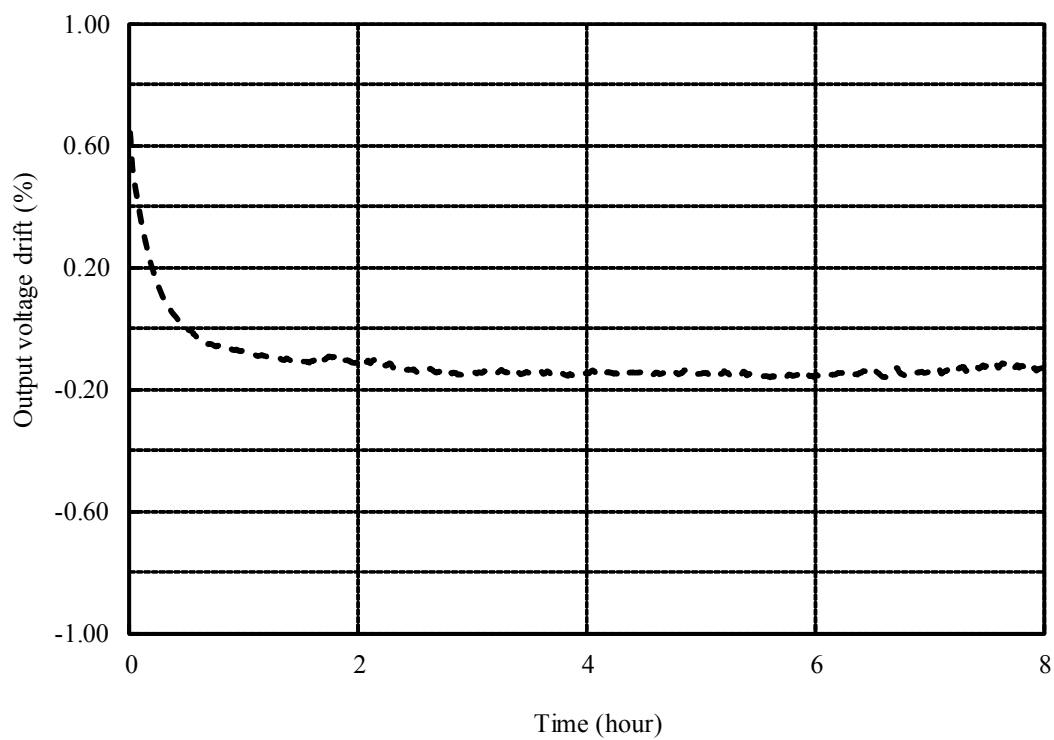
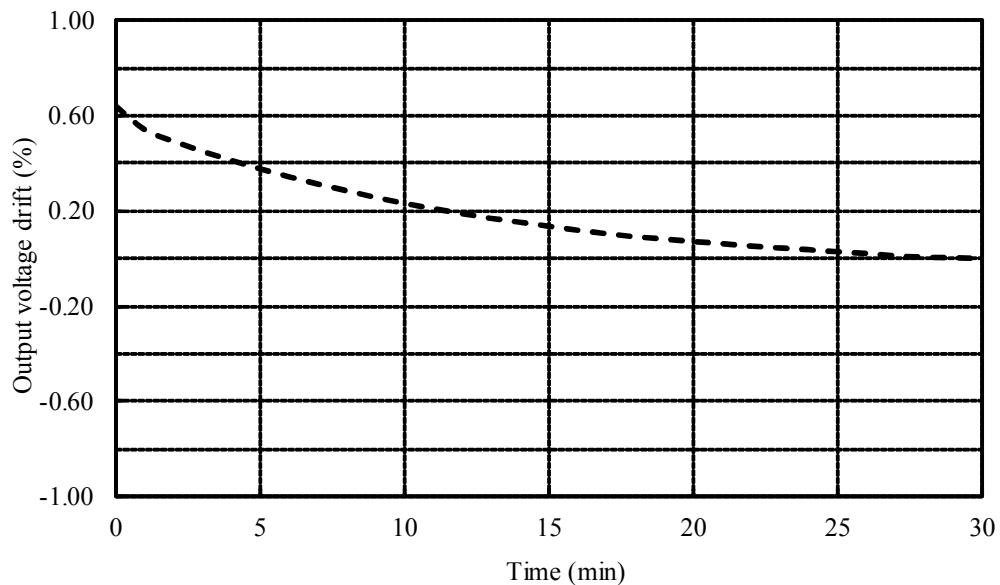
Iout : 0.35 A

(2) 効率対出力電流 Efficiency vs. Output current



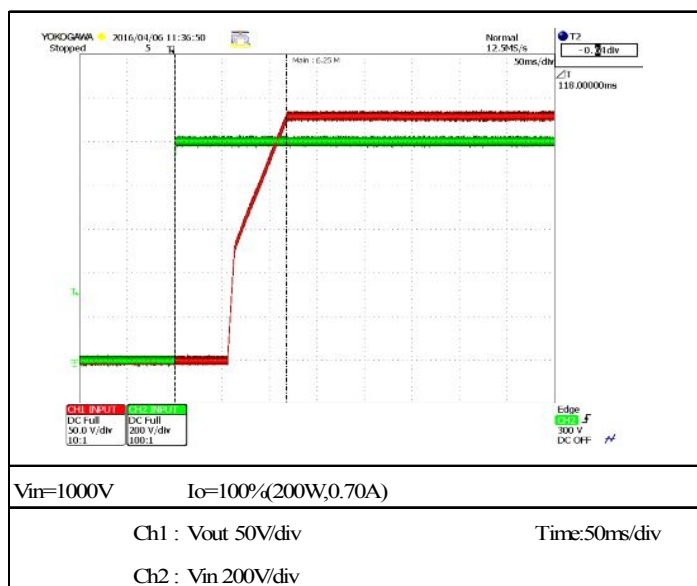
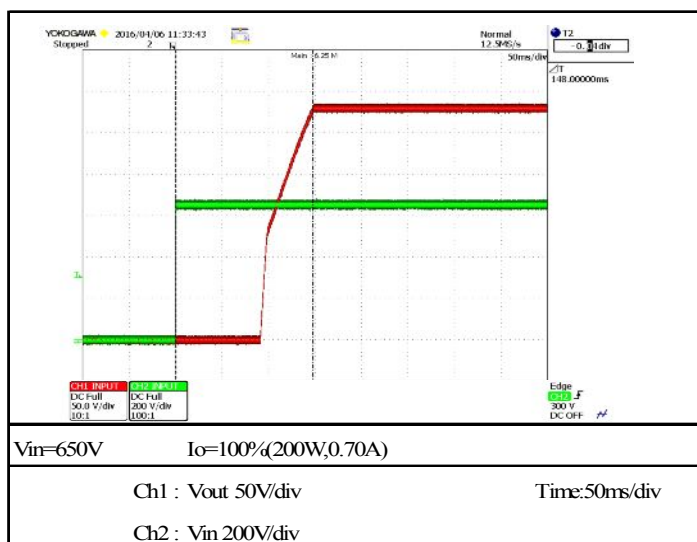
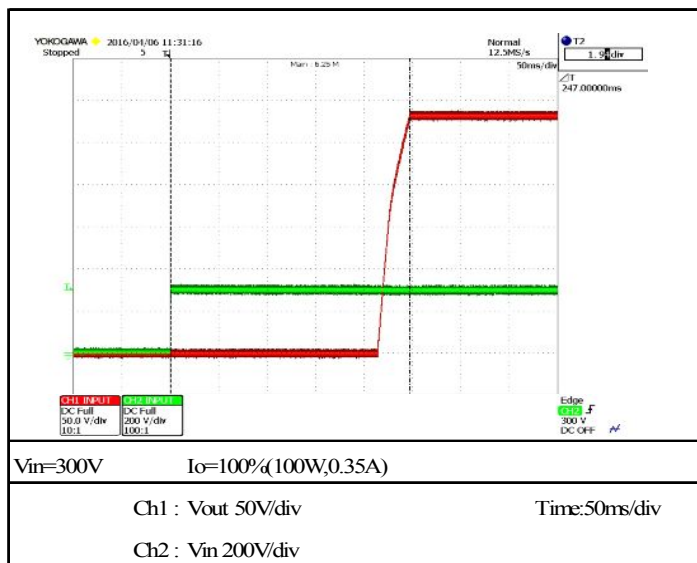
2.2 通電ドリフト特性 Warm up voltage drift characteristics

Conditions V_{in} : 650VDC
 T_a : 25°C
 I_o : 0.7A



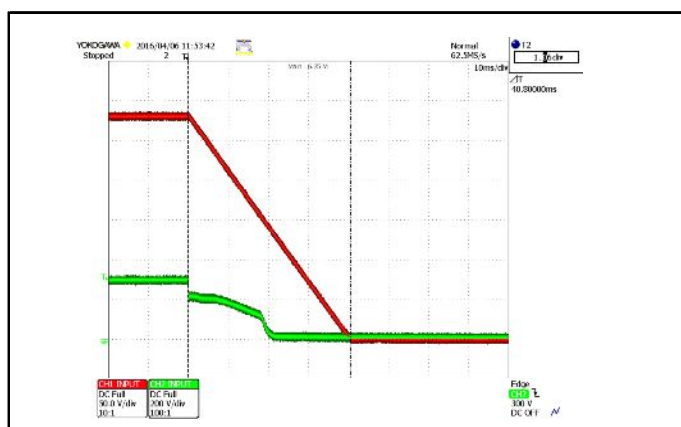
2.3 出力立ち上がり特性 Output rise characteristics

Ta : 25°C



2.4 出力立ち下がり特性 Output fall characteristics

Conditions Ta : 25°C



Vin=300V Io=100%(100W,0.35A)

Ch1 : Vout 50V/div

Time:10ms/div

Ch2 : Vin 200V/div

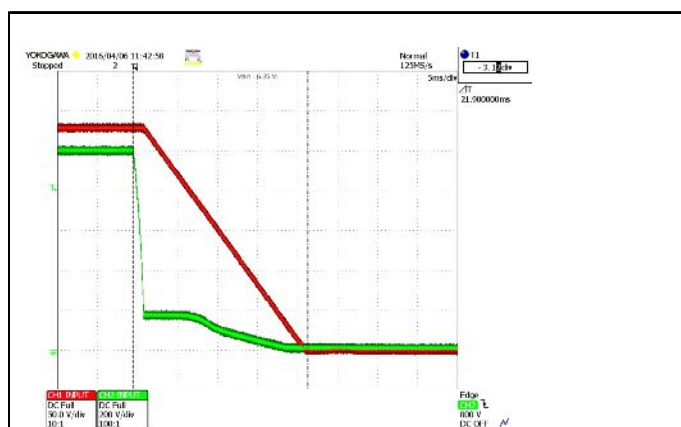


Vin=650V Io=100%(200W,0.70A)

Ch1 : Vout 50V/div

Time:5ms/div

Ch2 : Vin 200V/div



Vin=1000V Io=100%(200W,0.70A)

Ch1 : Vout 50V/div

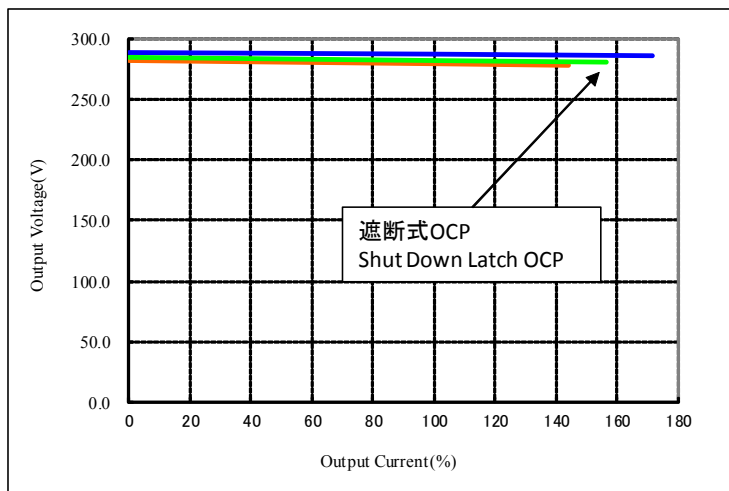
Time:5ms/div

Ch2 : Vin 200V/div

2.5 過電流保護特性 Over current protection (OCP) characteristics

Conditions Ta : -20°C ——— (Blue line)
 +25°C ——— (Green line)
 +60°C ——— (Orange line)

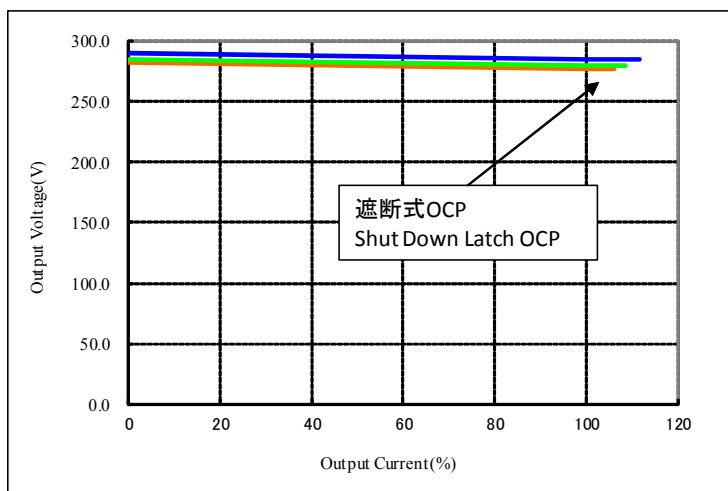
Vin = 300V(100W)



Vin=300VDC,100W

OCP Point		
Ta[°C]	Io[A]	Io[%]
-20	0.600	171.4%
+25	0.548	156.6%
+60	0.504	144.0%

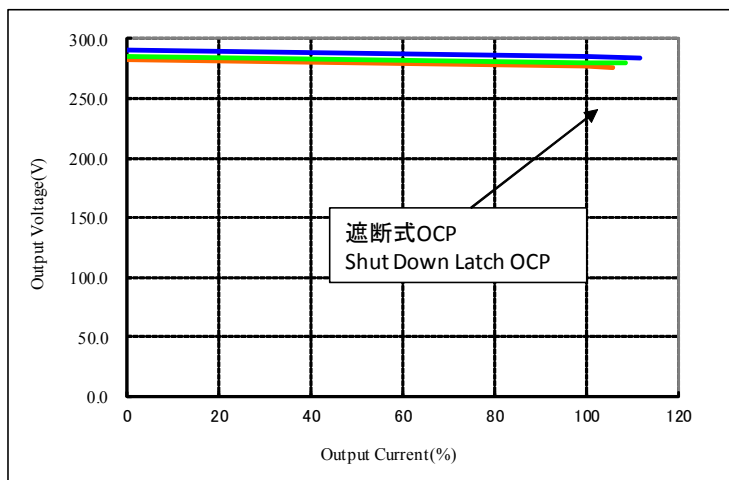
Vin = 450V(200W)



Vin=450VDC,200W

OCP Point		
Ta[°C]	Io[A]	Io[%]
-20	0.782	111.7%
+25	0.760	108.6%
+60	0.742	106.0%

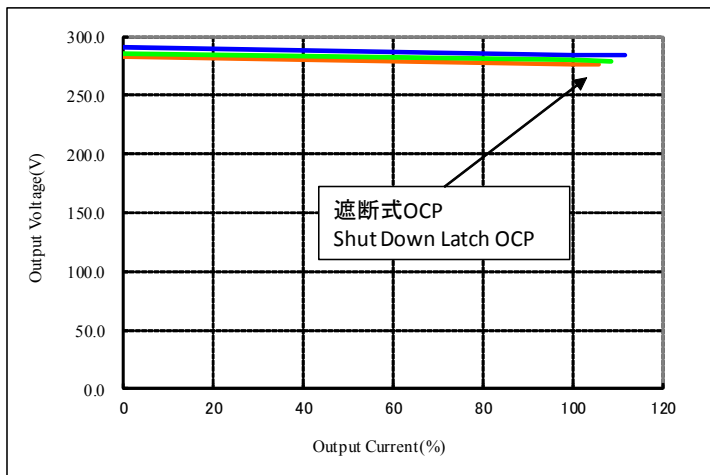
Vin = 650V(200W)



Vin=650VDC,200W

OCP Point		
Ta[°C]	Io[A]	Io[%]
-20	0.782	111.7%
+25	0.760	108.6%
+60	0.742	106.0%

Vin = 1000V(200W)

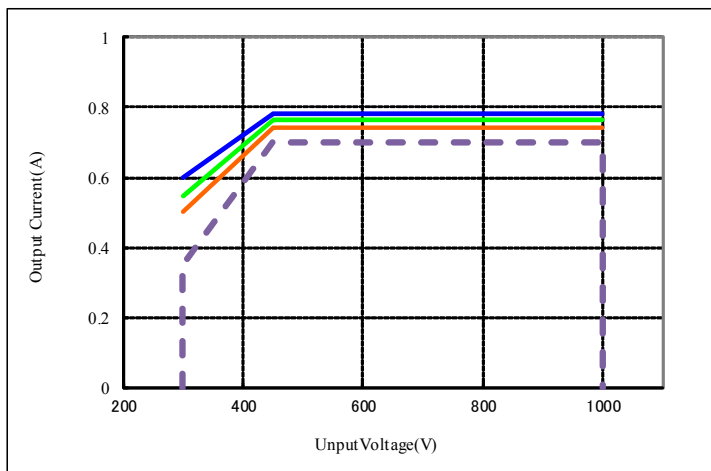


Conditions Ta : -20°C — (blue line)
 +25°C — (green line)
 +60°C — (orange line)

V_{in}=1000VDC,200W

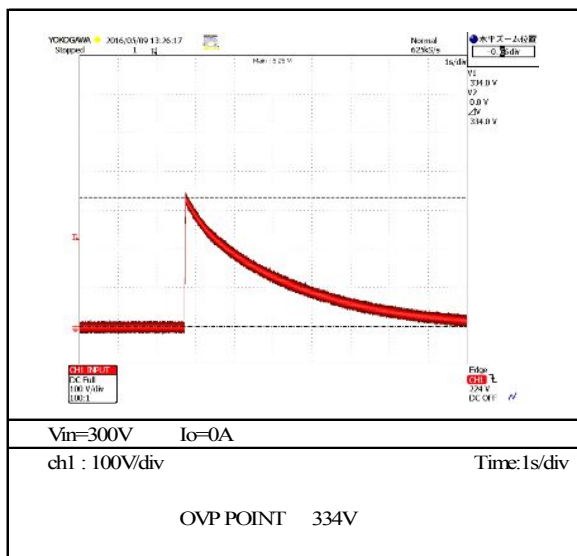
OCP Point		
Ta[°C]	I _o [A]	I _o [%]
-20	0.782	111.7%
25	0.760	108.6%
60	0.742	106.0%

OCP Point Check

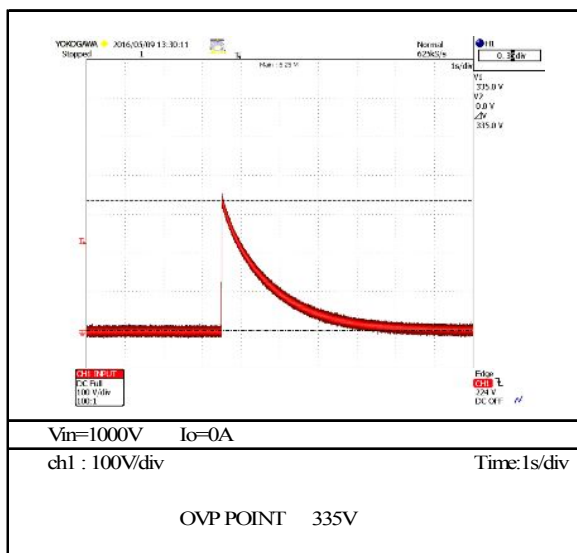
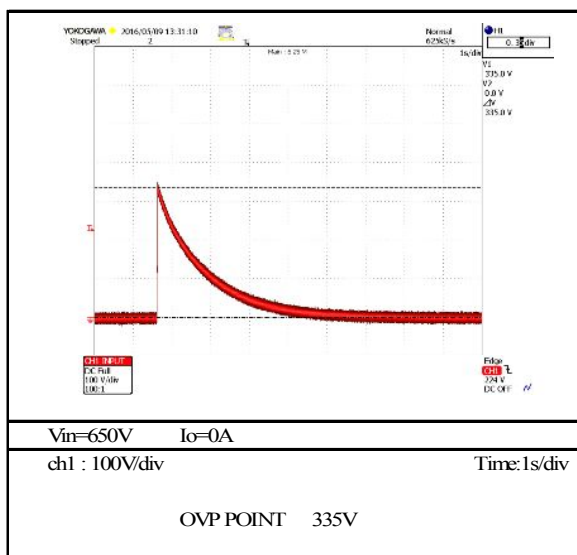


Output Derating — (dashed purple line)

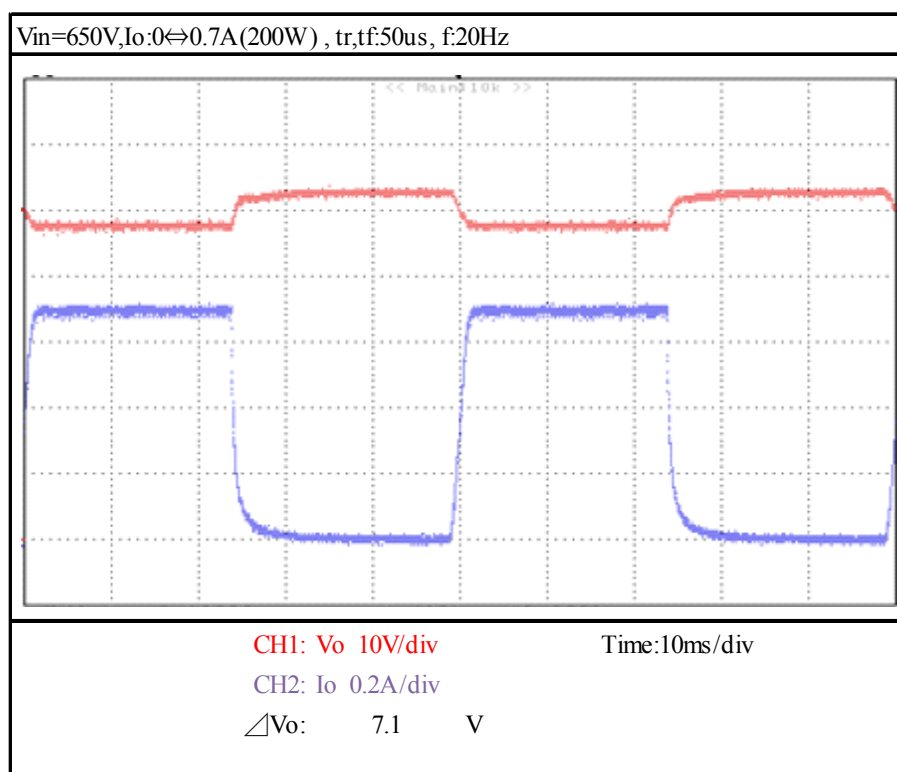
2.6 過電圧保護特性 Over voltage protection (OVP) characteristics



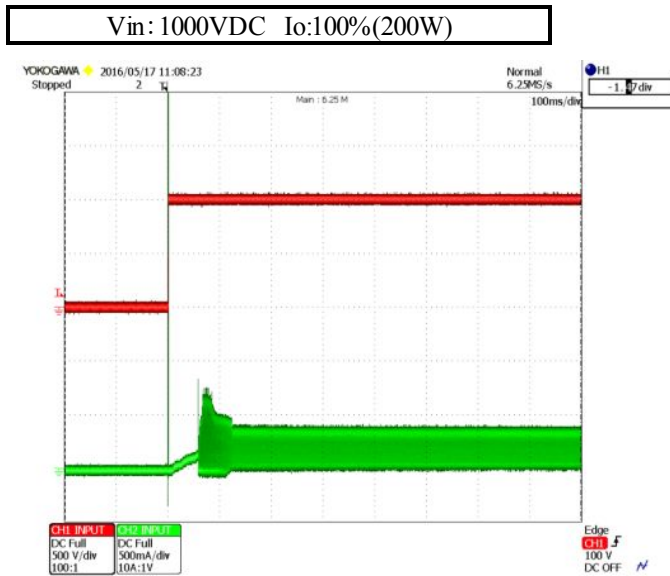
Ta[°C]	OVP point[V]		
	Vin=300V	Vin=650V	Vin=1000V
-20	334	338	340
25	334	335	335
60	332	335	334



2.7 過渡応答(負荷急変)特性 Dynamic load response characteristics



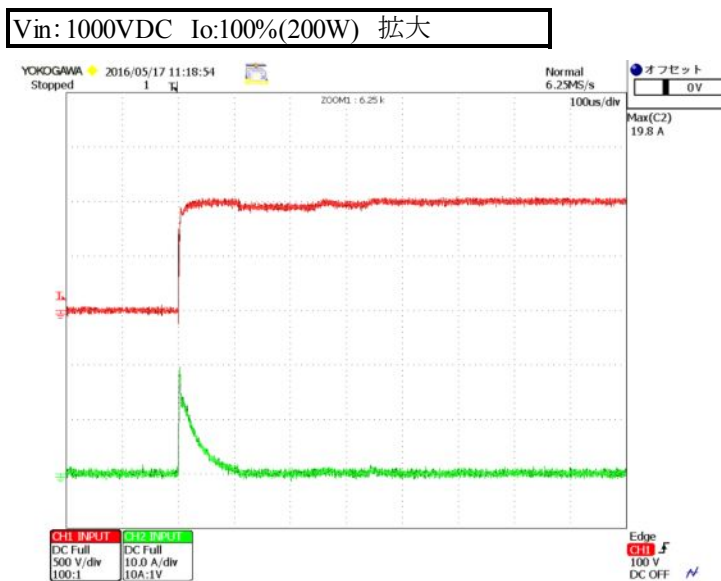
2.8 入力サージ電流(突入電流)波形 Inrush current waveform



入力電圧
500V/div

入力電流
500mA/div

Time
100ms/div



入力電圧
500V/div

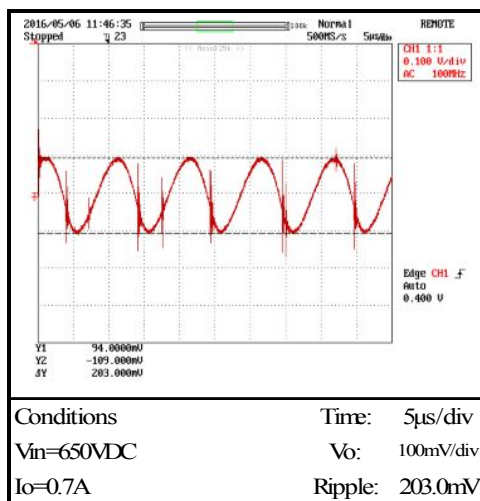
入力電流
10A/div

Time
100 µ s/div

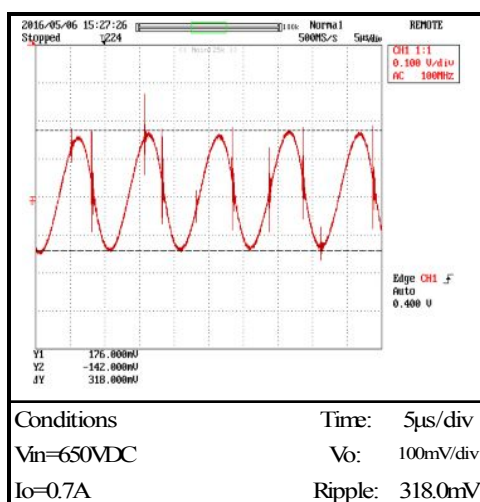
2.9 出力リップル、ノイズ波形 Output ripple and noise waveform

Conditions V_{in} : 650VDC
 I_{out} : 100%

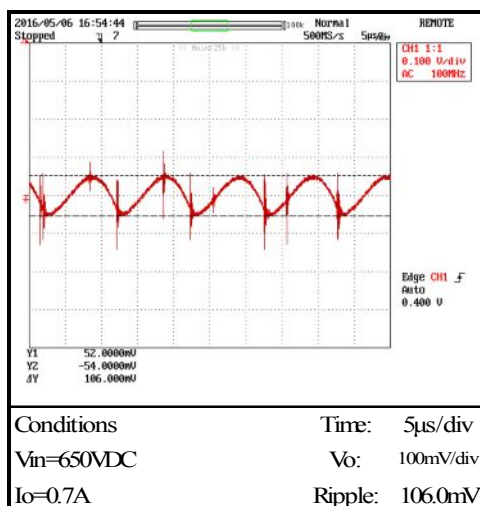
$T_a=25^{\circ}\text{C}$



$T_a=20^{\circ}\text{C}$



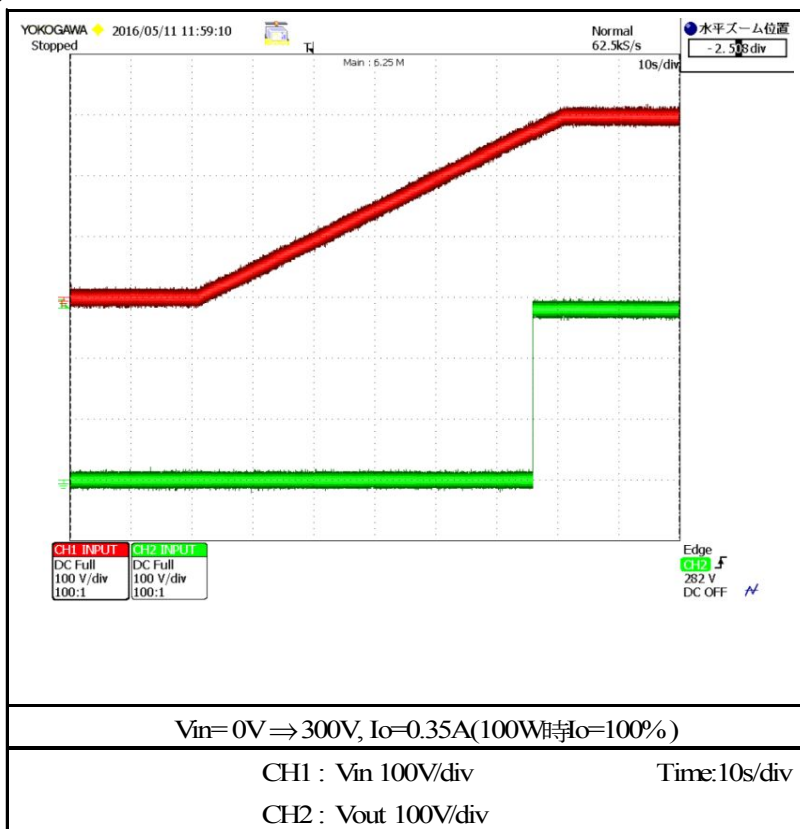
$T_a=60^{\circ}\text{C}$



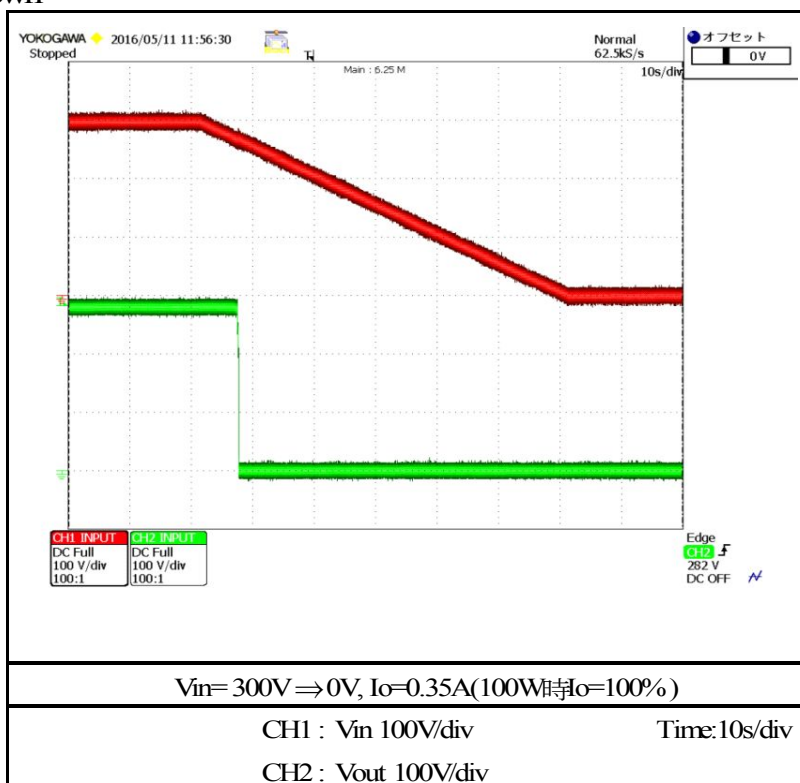
2.10 入力緩変 Input voltage slow up/ slow down

Ta: 25°C

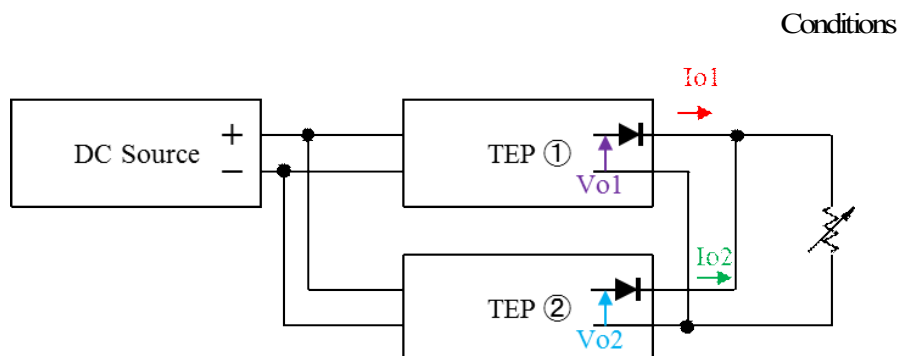
Slow Up



Slow Down



2.11 並列運転 Parallel operation

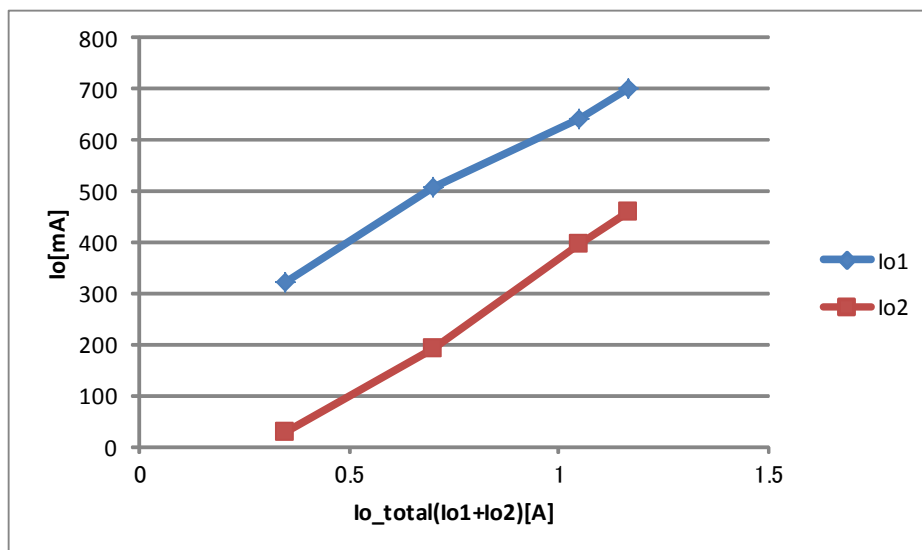


Conditions
 Vin : 650VDC
 Ta : 25°C

$\Delta V = 2.0V (Vo1 - Vo2)$

OCP Point $I_o \text{ total} = 1.35[A]$

$I_o \text{ total}[A]$	0	0.35	0.7	1.05	1.168
$V_o[V]$	283.4	280.9	279.6	278.7	278.1
$V_{o1}[V]$	283.9	281.9	280.7	279.8	279.2
$V_{o2}[V]$	282.0	281.5	280.4	279.7	279.1
$I_{o1}[mA]$	-	323	506	642	700
$I_{o2}[mA]$	-	28	192	397	461
$I_{o1}[\%]$	-	92.0	72.5	61.8	60.3
$I_{o2}[\%]$	-	8.0	27.5	38.2	39.7



2.12 PF信号 Power Fail signal

PF: High⇒Low

	Vout[V]		
	Ta=25°C	-20°C	60°C
Io=0%	248.5	248.5	250.0
Io=100%	247.5	248.5	248.0

PF: Low⇒High

	Vout[V]		
	Ta=25°C	-20°C	60°C
Io=0%	248.5	248.5	250.0
Io=100%	247.5	248.5	248.0

Io=0%

