QUALITY TEST DATA

KS15

DWG. NO.		PA759 - 53 - 01			
QA APPROVAL		R / D			
NLJ	NLS	APPROVED	CHECKED	ENGR.	DRAWN
					S.Y. Lim
19 · MAR 92	10 · MAR 92	10 · MAR · 92	10 · MAR · 92	17 · 2 · 92	17 · 2 · 92

NEMIC-LAMBDA

—— INDEX ——

Terminology used

	Definition
Vin	Input voltage
Vout	Output voltage
Iin	Input current
Iout	Output current
Ta	Temperature

KS15 Specifications

NEMIC-LAMBDA

*: For delivery, contact to our sales office.

PA759-01-01A

	ITEMS / MODEL			KS15-5	KS15-12
1	Nominal Output Voltage		V	5	12
2	Minimum Output Current		A	0	0
3	Maximum Output Current		A	3.0	1.3
4	Maximum Output Power		W	15.0	15.6
5	Efficiency (typ)	(*1)	%	74	76
6	Input Voltage Range	(*2)	-	85 ~ 132VAC (47~440Hz) or 110 ~ 175VDC	
7	Input Current (typ)	(*1)	A	0.4A at 100VAC	
8	Inrush Current (typ)		A	10A at 100VAC, Ta = 25°C	
9	Output Voltage Range		-	FIXED ±5% (Max)	
10	Maximum Ripple & Noise	(*3)	mV	120	150
11	Maximum Line Regulation	(*3,*4)	mV	20	48
12	Maximum Load Regulation	(*3,*5)	mV	40	96
13	Maximum Temperature Drift	(*3,*6)	mV	50	120
14	Over Current Protection	(*7)	-	105% ~	
15	Over Voltage Protection	(*8)	-	110% ~	
16	Parallel Operation		-	———	
17	Series Operation		-	Possible	
18	Hold-Up Time (typ)		-	17mS at 15W, 100VAC, Ta = 25°C	
19	Operating Temperature		-	-10°C ~ +70°C (-10°C : 80%, 0~+50°C : 100%, +70°C : 25%)	
20	Operating Humidity		-	30 ~ 90%RH (No dewdrop)	
21	Storage Temperature		-	-30 ~ +85°C	
22	Storage Humidity		-	20%RH ~ 95%RH (No dewdrop)	
23	Cooling		-	Convection Cooling	
24	Withstand Voltage		-	Input-Output : 2kVAC(20mA), Input-FG : 2kVAC(20mA) Output-FG : 500VAC(100mA) for 1minute each.	
25	Isolation Resistance		-	More than100MΩ at 25°C and 70%RH Output-FG 500VDC	
26	Vibration		-	10~55Hz, Constant Amplitude 1.65mm p-p (Max 10G), sweep 1 Minute X,Y,Z 1 hour each	
27	Shock		-	Less than 50G for 11±5mS on ± (X, Y, Z) axis each 3 times	
28	Safety		-	Approved by UL1950,CSA234	
29	Conducted Radio Noise		-	Built to meet VCCI-Class A, FCC class B	
30	Weight		g	100g	
31	Size (WxHxD)		mm	45 x 20.5 x 64 (Refer to Outline Drawing)	

* Read Instruction manual carefully, before using the power supply unit.

= NOTES =

*1. At 100VAC and Maximum Output Power, Ta=25C.

*2. For cases where conformance to various safety specs (UL, CSA) are required to be described as 100-120VAC, 50/60Hz on name plate.

*3. Please refer to Fig. A for measurement determination of line & load regulation and output ripple & noise voltage.

*4. From 85~132VAC, constant load.

*5. From Min load - Full load (Maximum power), constant input Voltage.

*6. From 0~50°C, constant input voltage and load.

*7. Current limiting with automatic recovery. Avoid to operate over load or dead short for more than 30seconds.

*8. Over Voltage Clamping by Zener Diode.

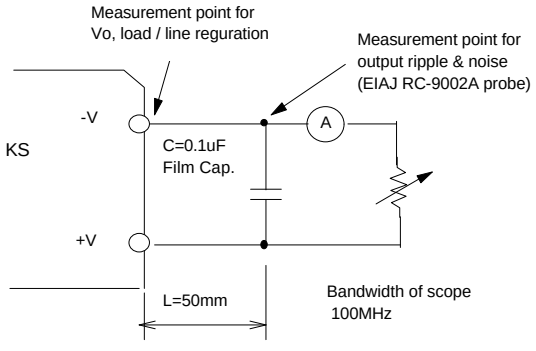
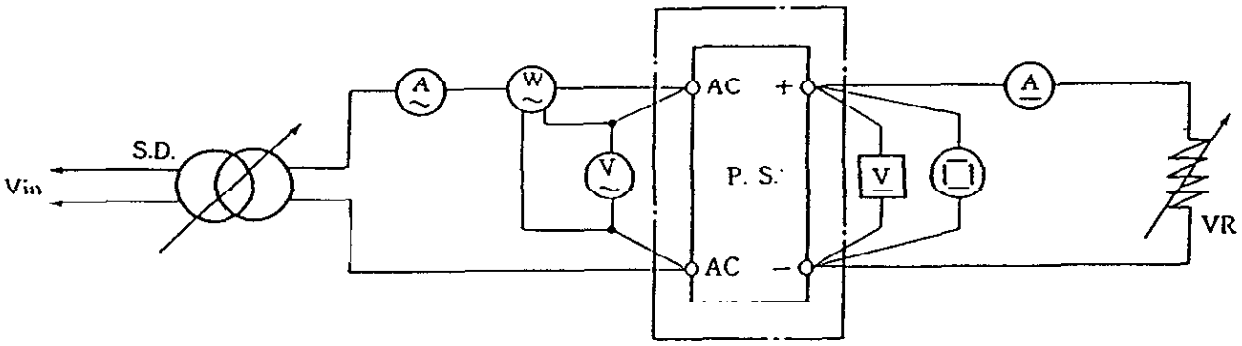


Fig.A

2．評価測定方法　EVALUATION METHOD

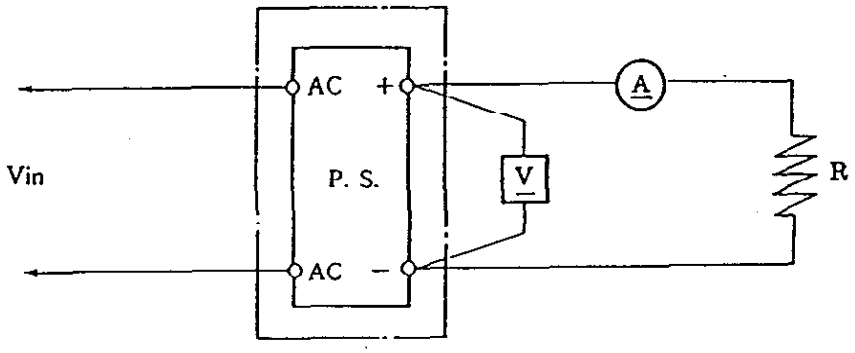
2－1　測定回路　Circuits used for determination

(1)　静特性　Steady state data



controlled temp.,chamber

(2)　通電ドリフト特性　Warm up voltage drift characteristics

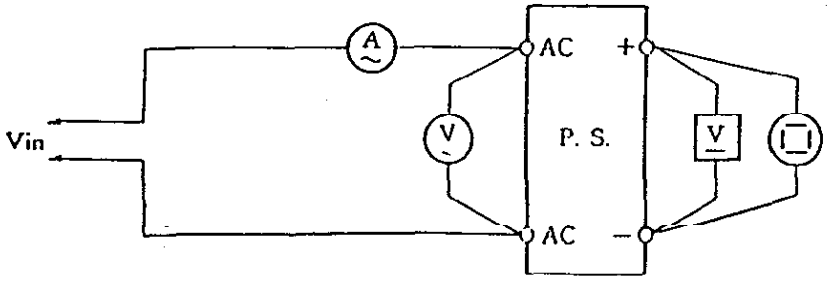


controlled temp.,chamber

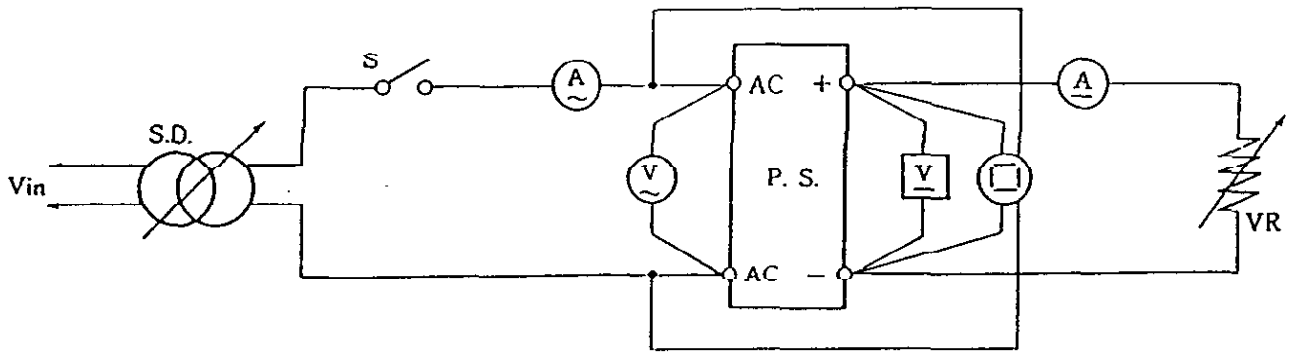
(3)　過電流保護特性　Over current protection (OCP) characteristics

Same as steady state data.

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



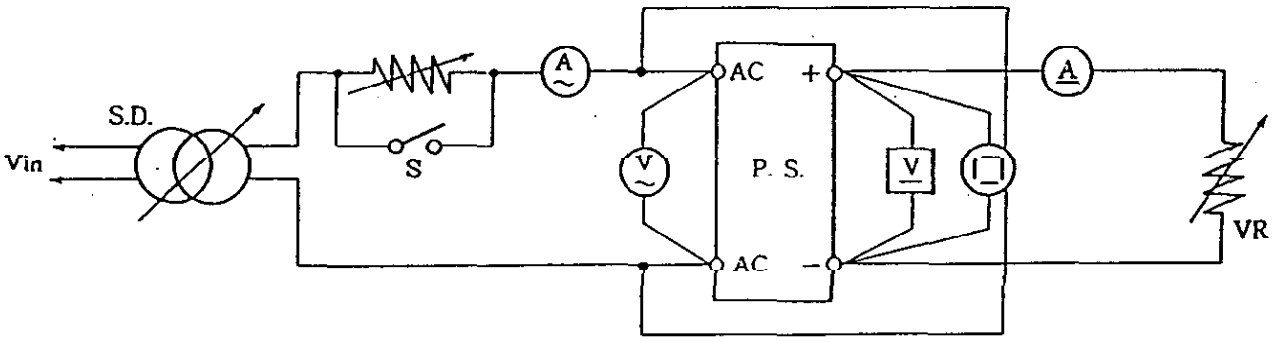
(5) 出力立上り特性 Output rise characteristics



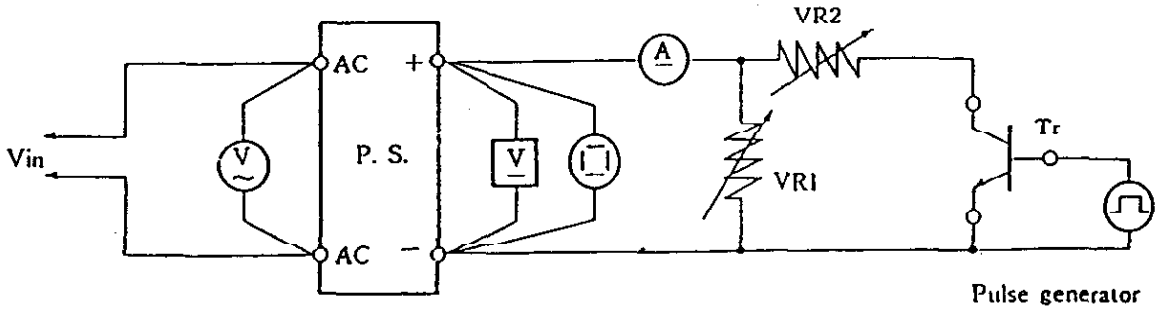
(6) 出力立下り特性 Output fall characteristics

Same as output rise characteristics.

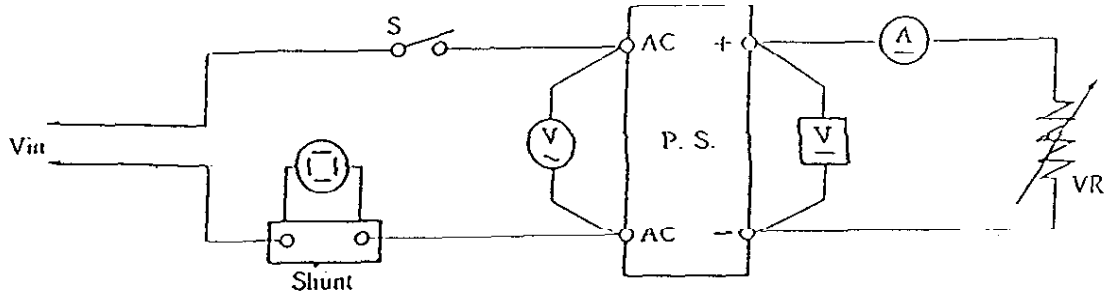
(7) 過渡応答（入力急変）特性 Dynamic line response characteristics



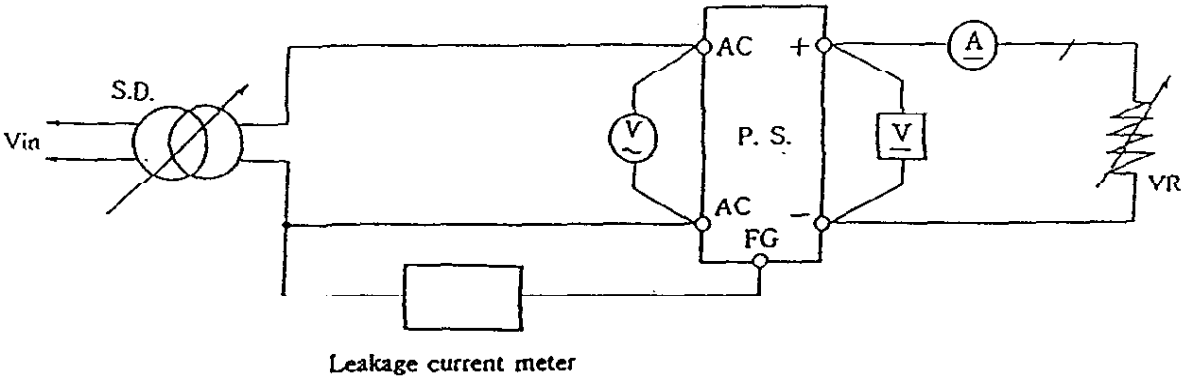
(8) 過渡応答（負荷急変）特性 Dynamic load response characteristics



(9) 入力サージ電流（突入電流）特性 Inrush current characteristics



(10) リーク電流（漏洩電流）特性 Leakage current characteristics



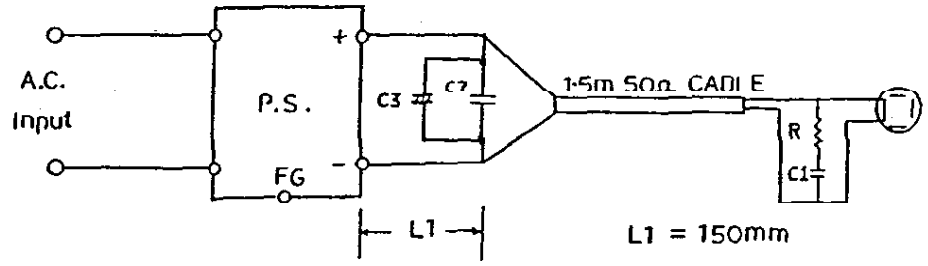
Note : Leakage current measured through a 1kΩ resistor.

Range wed : AC + DC

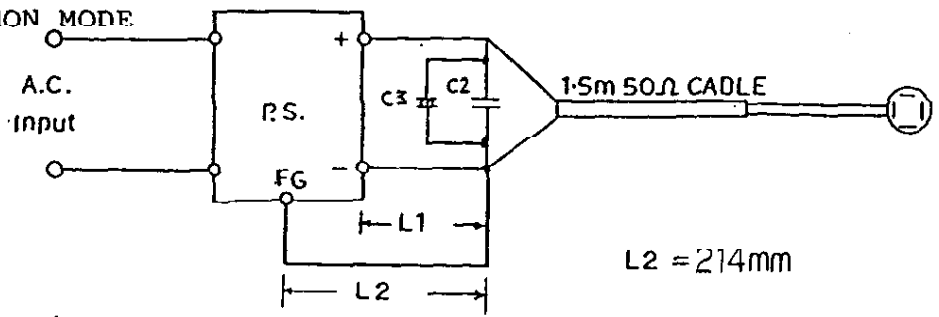
11) Output-ripple, noise

R = 50Ω
C1 = 4700pF
C2 = 0.1μF
C3 = 100μF

a) NORMAL MODE



b) NORMAL + COMMON MODE



2－2　使用測定機器　List of equipment used

	EQUIPMENT USED	MANUFACTURER	MODEL NO.
1	Oscilloscope	HITACHI DENSHI	V-1065
2	Digital storage oscilloscope	HITACHI DENSHI	VC-6041
3	Digital voltmeter	IWATSU	VDAC 7411
4	Digital watt/current/volt meter	HIOKI	3182
5	DC Ampere meter	YOKOGAWA ELECTRIC	2051
6	Autotransformer	SUPERIOR ELECTRIC	136 BT
7	Variable resistive load	IWASHITA ELECTRIC	D-5-10/16
8	Dynamic dummy load	TAKAMIZAWA CYBERNETICS KIKUSUI	PSA-150D PLZ72W, PLZ150WA
9	Digirush currenter	TAKAMIZAWA CYBERNETICS	PSA-200
10	Current Probe/Amplifier	TEKTRONIX	A6303/AM503
11	Controlled Temp. Chamber	TABAI	PL-2GM
12	Leakage current meter	YOKOGAWA ELECTRIC	3226
13	Equipment for dynamic line response	- BUILT IN-HOUSE -	

REGULATION - Line and Load, Temp. Drift

KS15

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1. Regulation - Line and Load Condition Ta : 25°C

Iout \ Vin	AC 85 V	AC 100 V	AC 132 V	Line Regulation	
0 %	5.011 V	5.011 V	5.011 V	0 mV	0 %
50 %	5.006 V	5.006 V	5.006 V	0 mV	0 %
100 %	5.002 V	5.002 V	5.002 V	0 mV	0 %
Load	9 mV	9 mV	9 mV		
Regulation	0.18 %	0.18 %	0.18 %		

2. Temperature Drift Conditions Vin : AC100V
Iout : 100 %

Ta	0 °C	25 °C	50 °C	Temp. Stability	
Vout	4.998 V	5.002 V	5.009 V	11 mV	0.22 %

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1. Regulation - Line and Load Condition Ta : 25°C

Iout \ Vin	AC 85 V	AC 100 V	AC 132 V	Line Regulation	
0 %	11.969 V	11.969 V	11.969 V	0 mV	0 %
50 %	11.964 V	11.964 V	11.965 V	1 mV	0.01 %
100 %	11.963 V	11.964 V	11.965 V	2 mV	0.02 %
Load	6 mV	5 mV	4 mV		
Regulation	0.05 %	0.04 %	0.03 %		

2. Temperature Drift Conditions Vin : AC100V
Iout : 100 %

Ta	0 °C	25 °C	50 °C	Temp. Stability	
Vout	11.931 V	11.964 V	11.986 V	55 mV	0.46 %

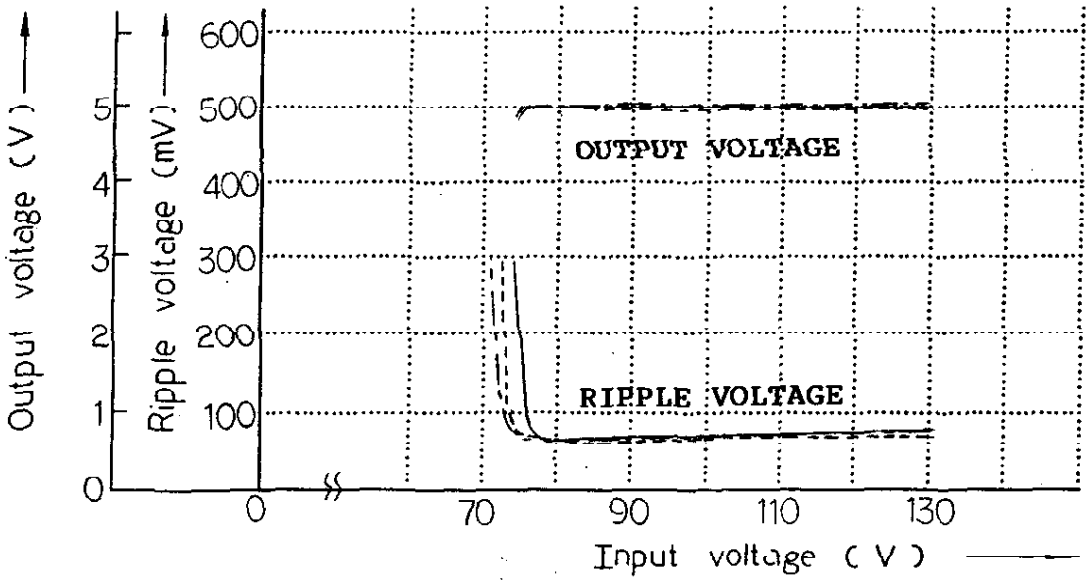
Output voltage and ripple voltage v.s input voltage

KS 15

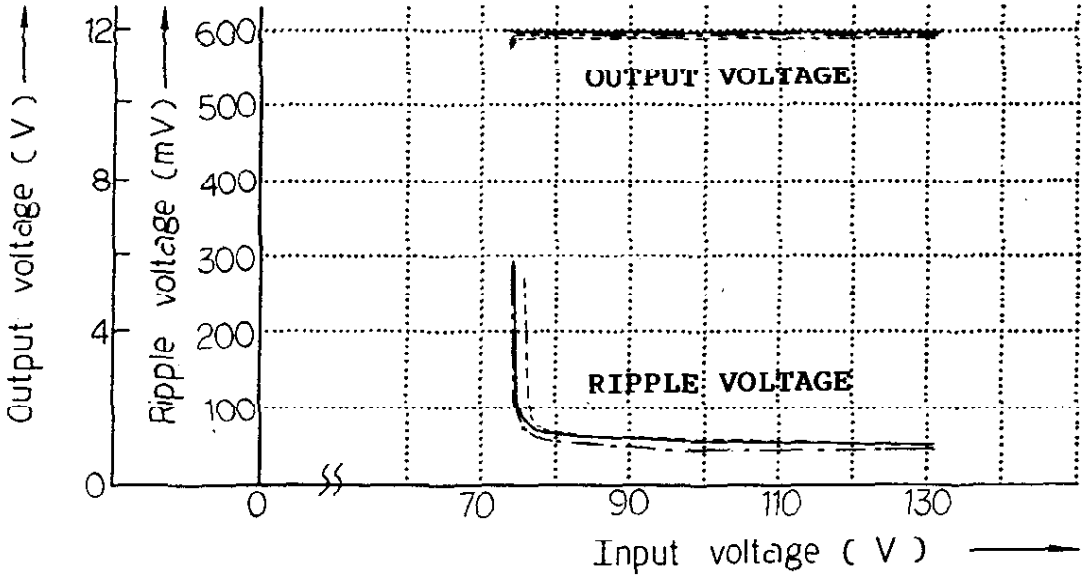
Iout 100 %

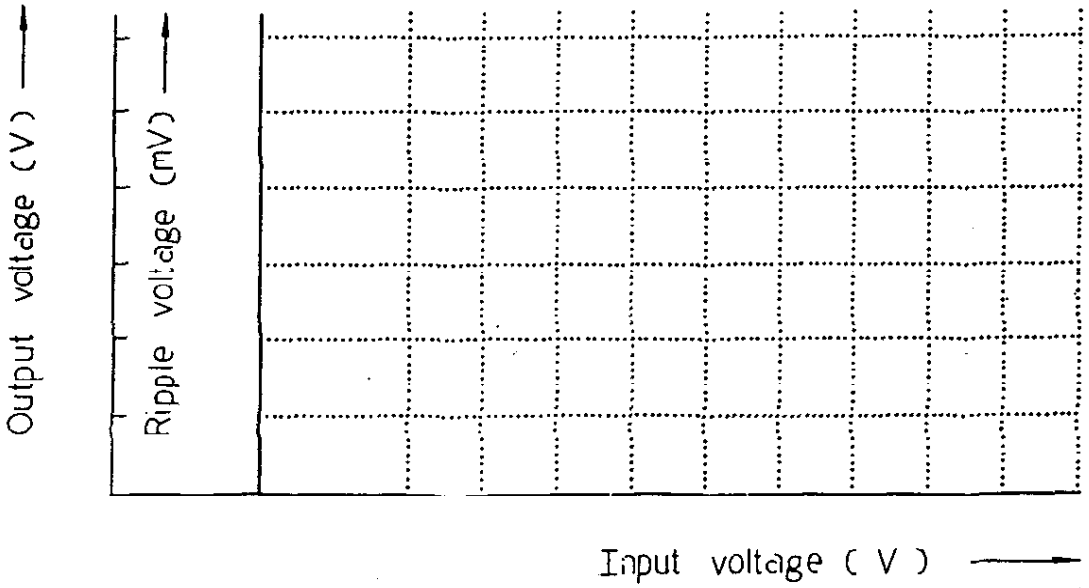
Conditions Ta : 0 °C ----- 25 °C — - — 50 °C ———

5V



12V



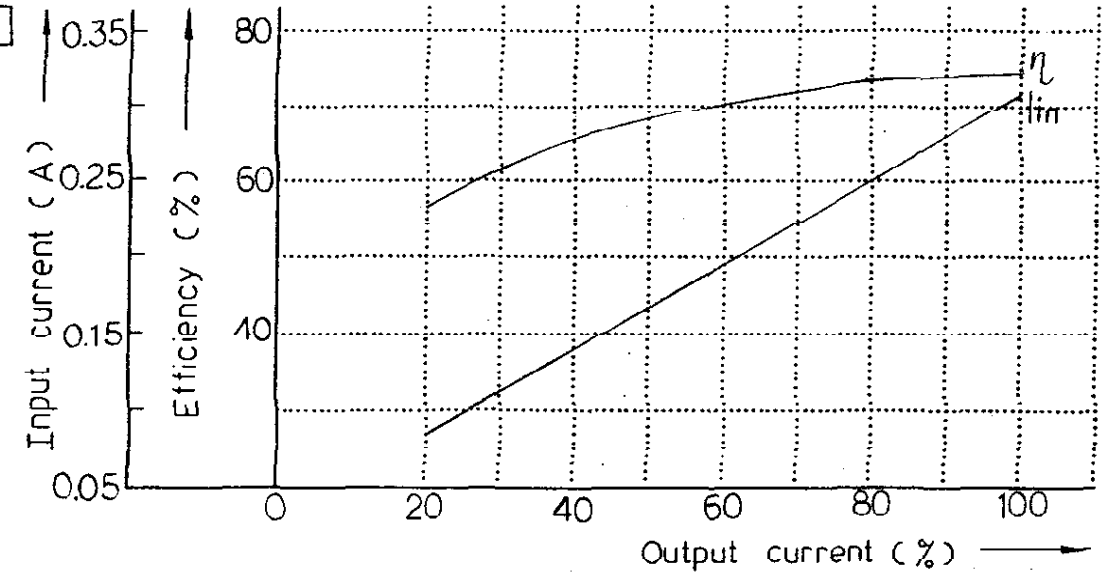


Efficiency and input current v.s output current

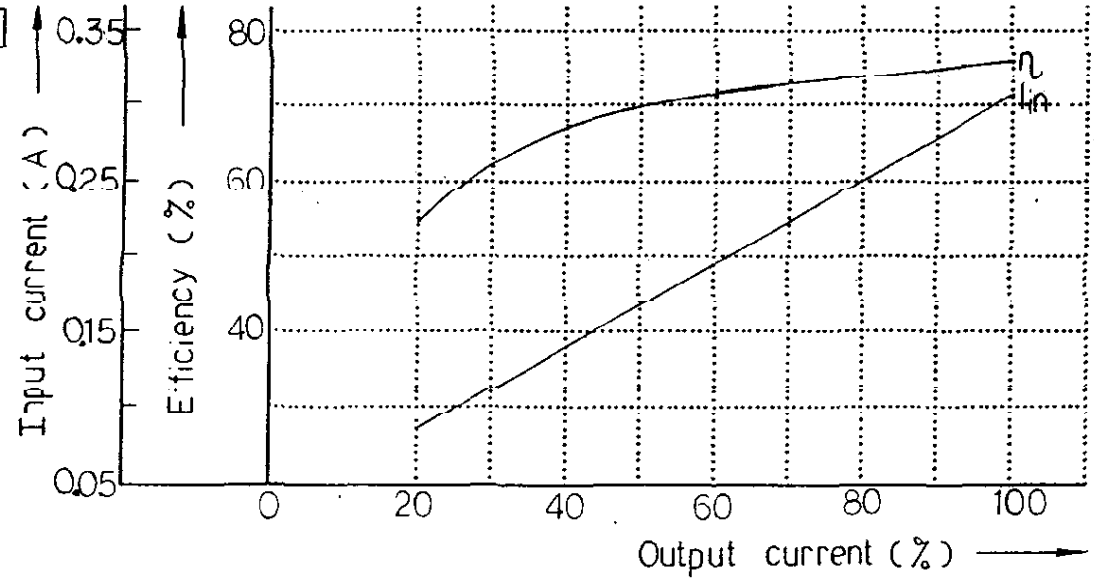
KS 15

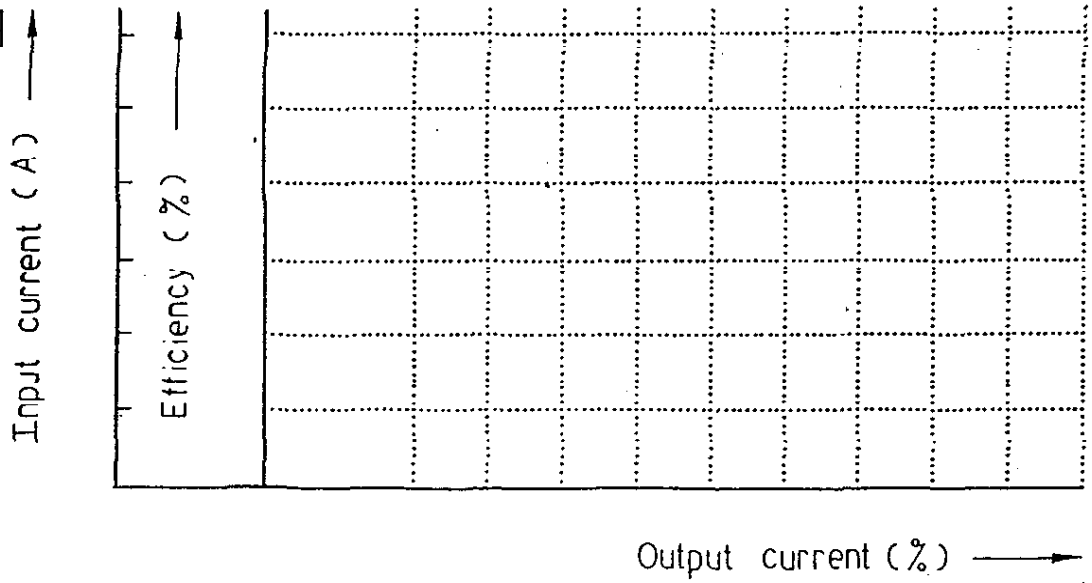
Conditions Vin : AC 100 v
Ta : 25°C

5V



12V





Warm up voltage drift

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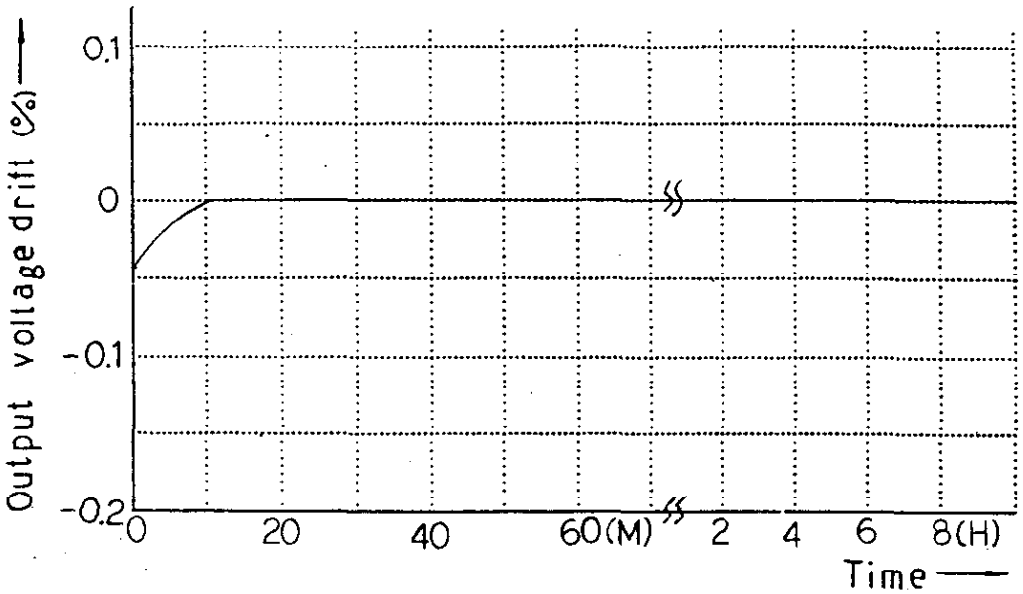
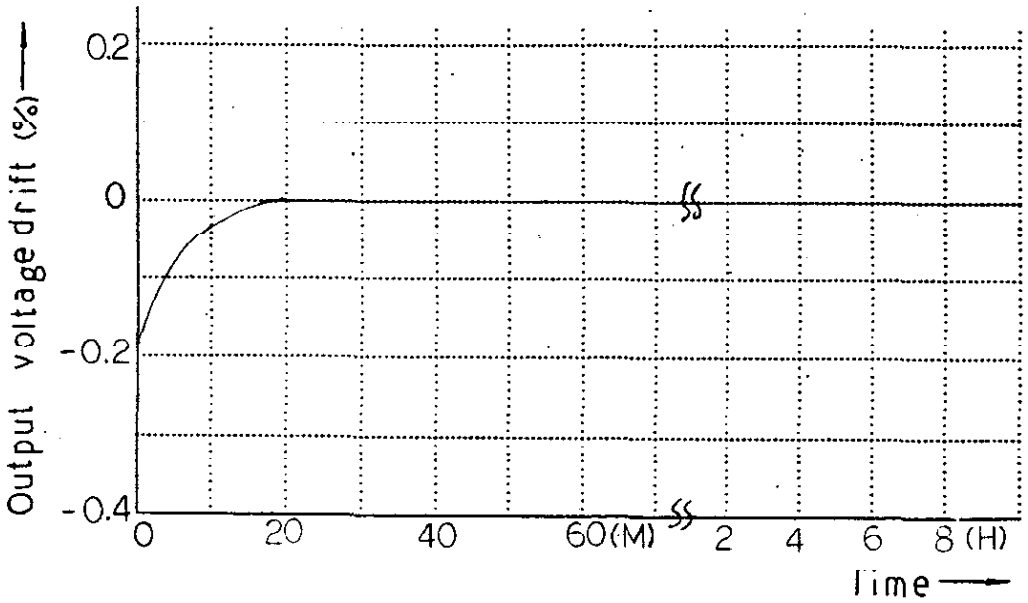
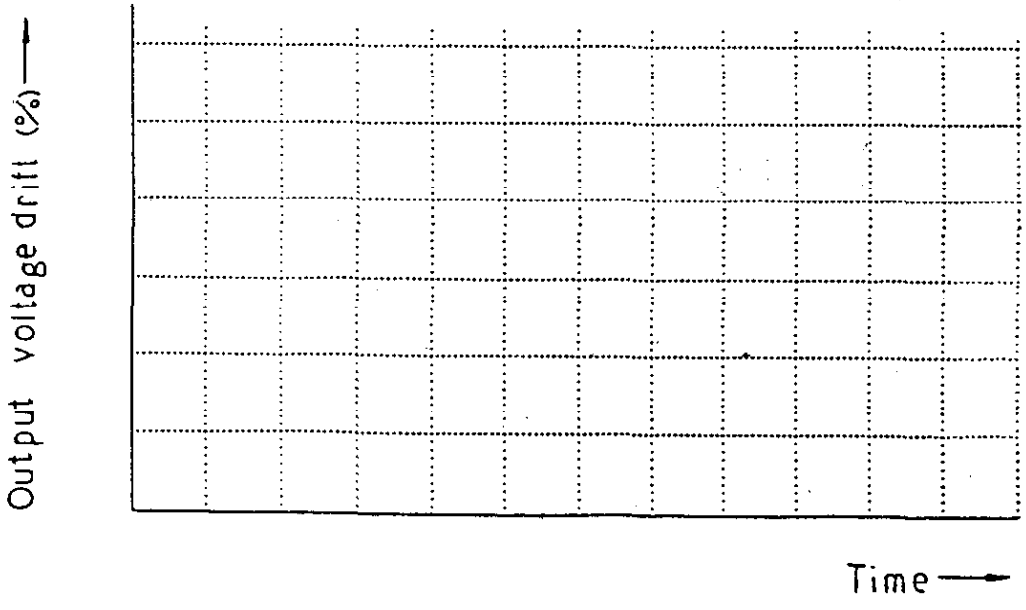
Conditions Vin : AC 100 v
Vout,Iout : 100 %
Ta : 25 °C

5V



12V





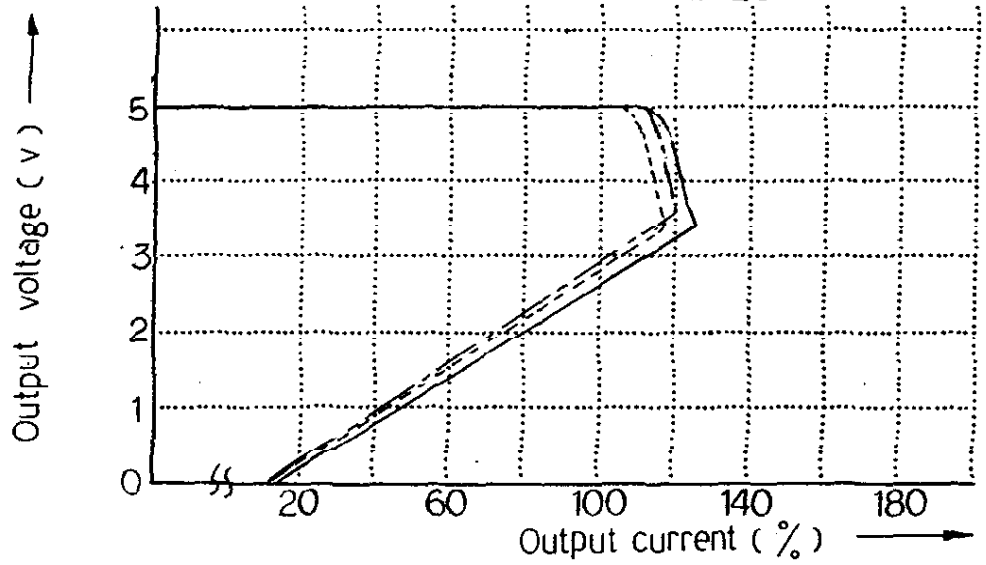
O.C.P Characteristics

KS 15

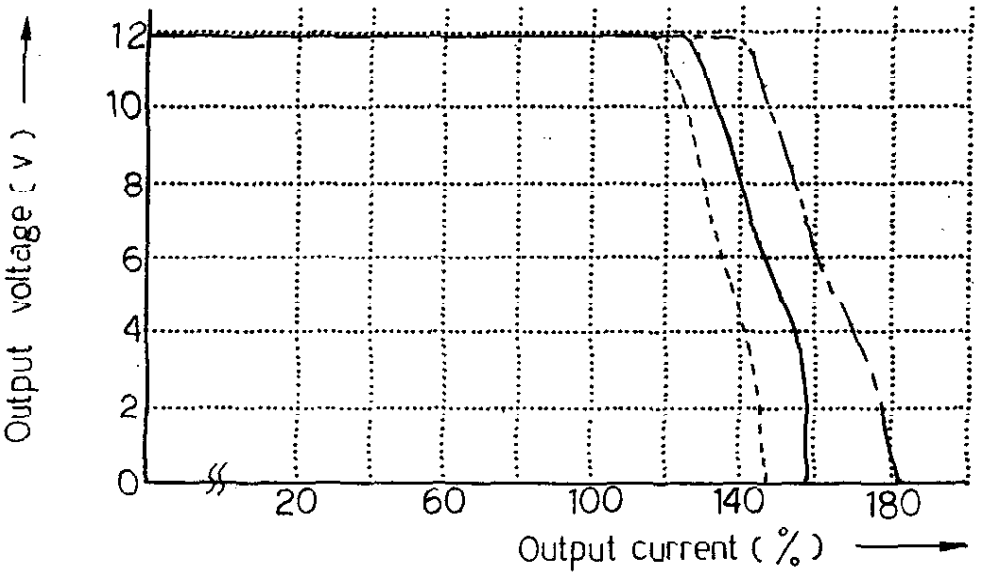
AC 85 v - - - - -
Conditions Vin: AC 100 v ——
AC 132 v - - - -

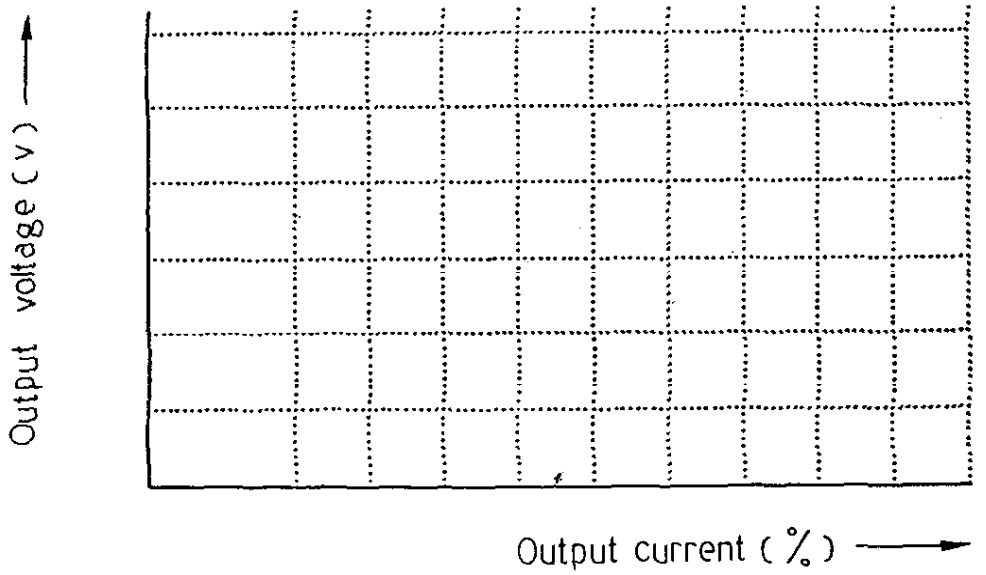
Ta: 25°C

5V



12V

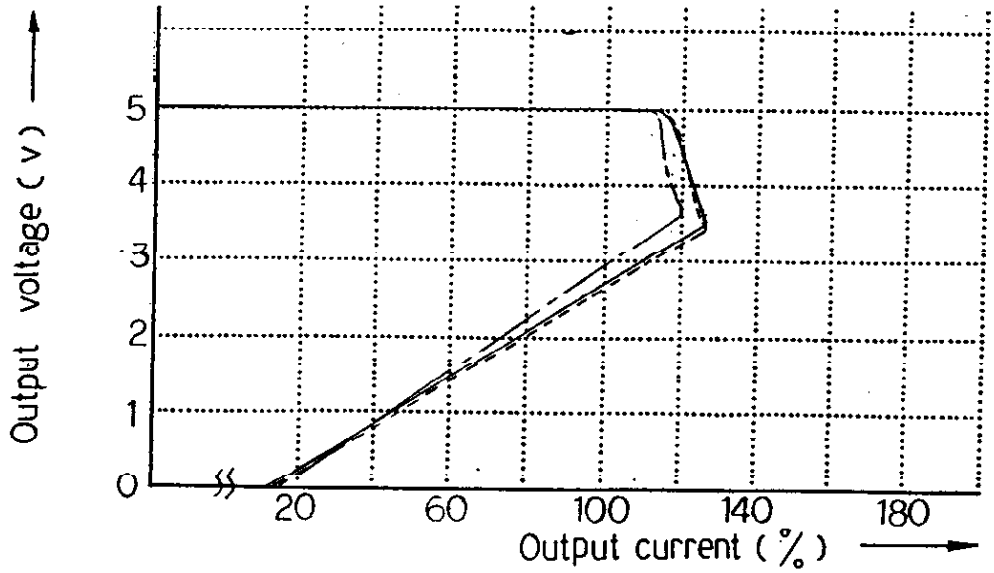




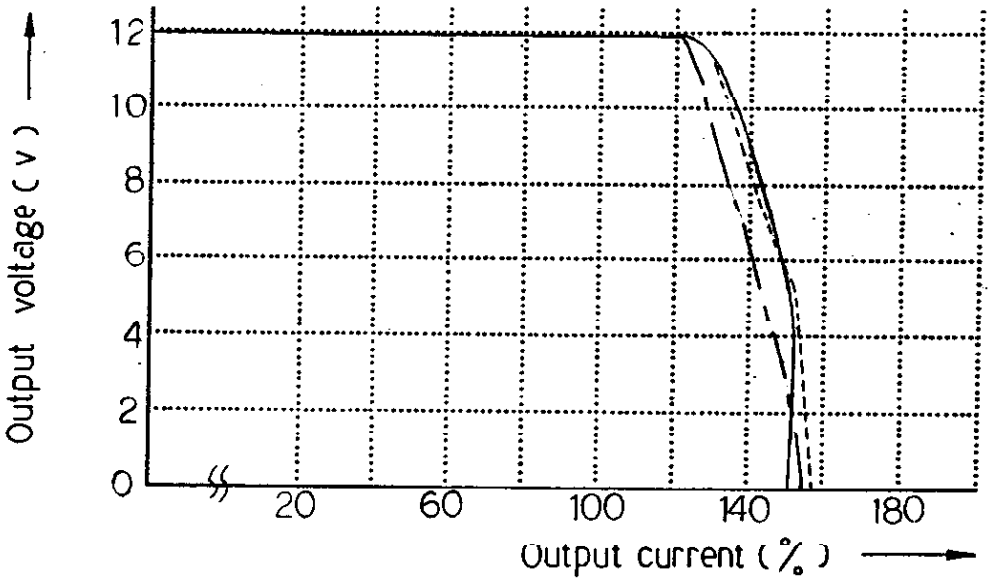
KS 15

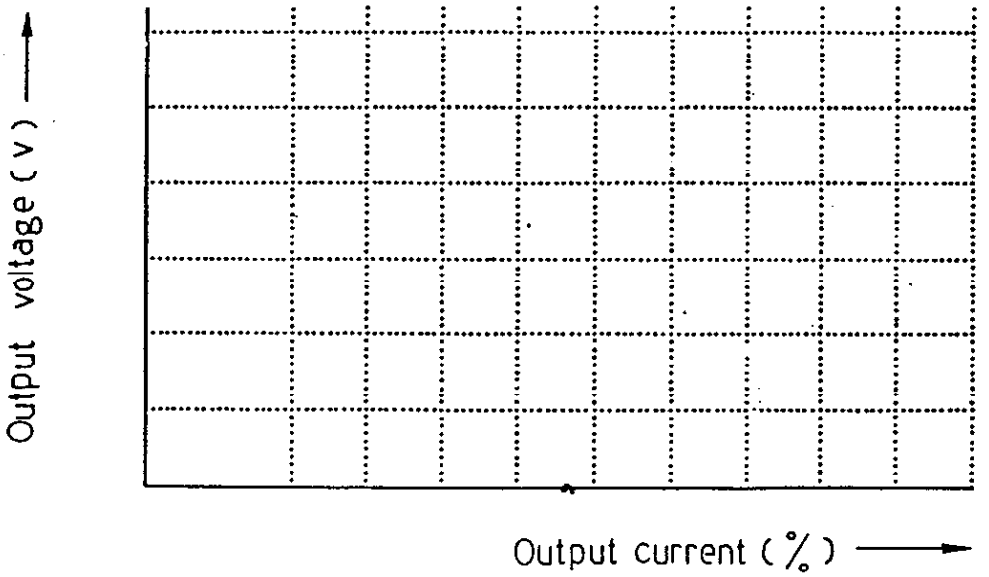
Conditions Vin : AC 100 v
Ta : 0°C ——
25°C - - - -
50°C — - —

5V



12V



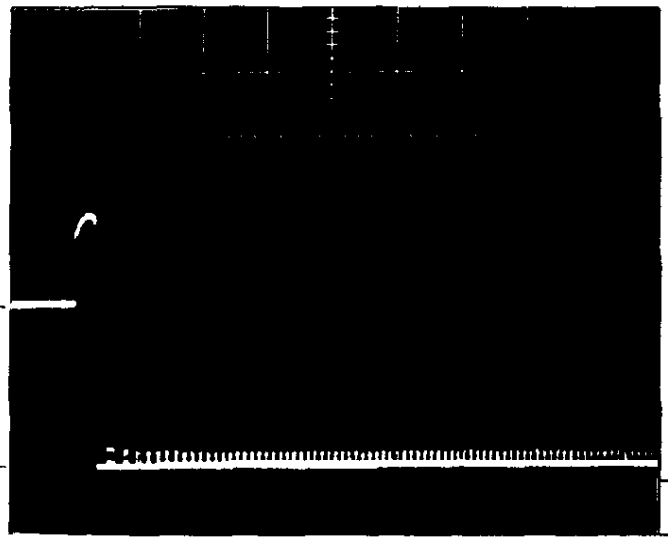


O.V.P Characteristics

KS 15

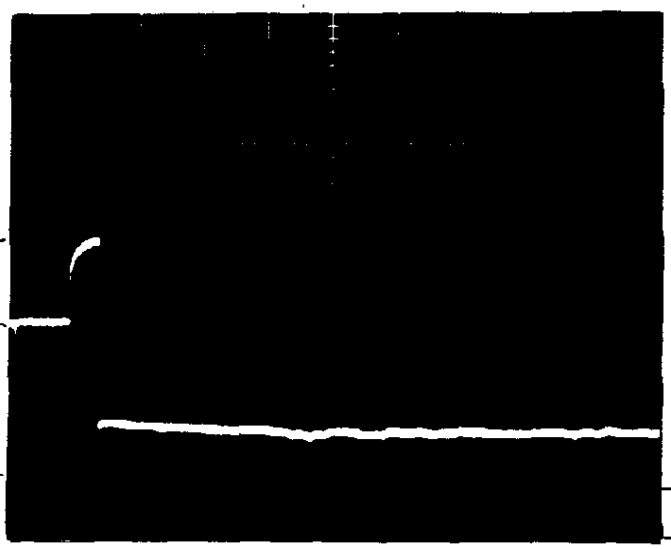
Conditions Vin: AC 100 v
Iout: 0 %
Ta: 25°C

5V

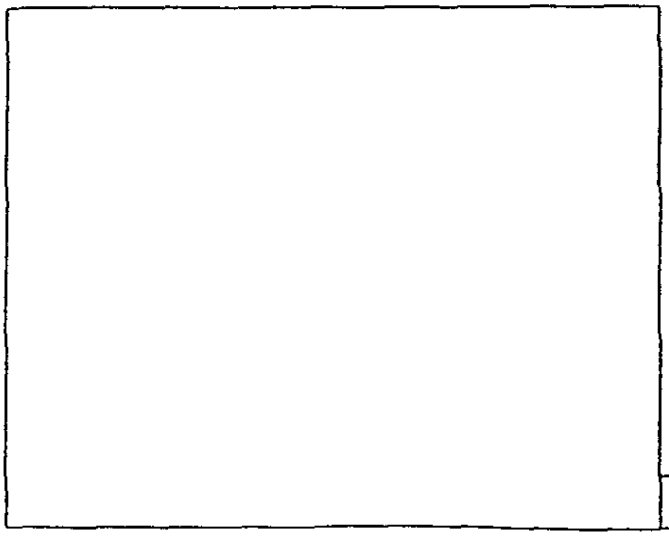


2 V/DIV | 5 s/DIV

12V



5V/DIV | 5 s/DIV



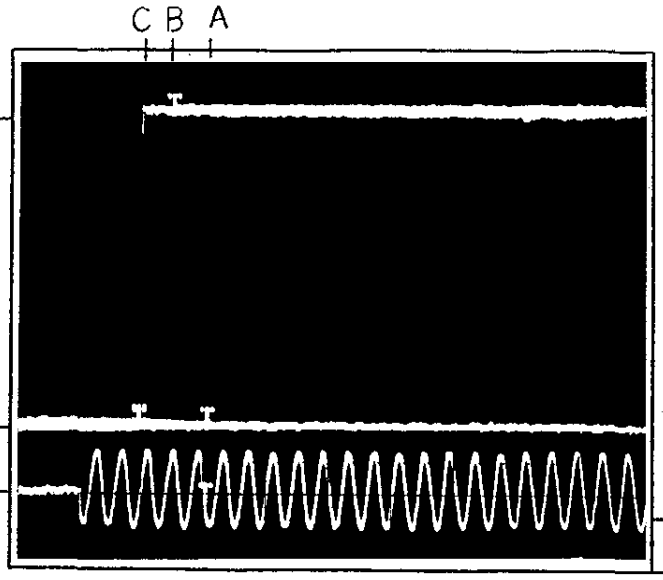
V/DIV | s/DIV

Output rise time

KS15

Conditions Vin: AC 85v (A)
100v (B)
132v (C)

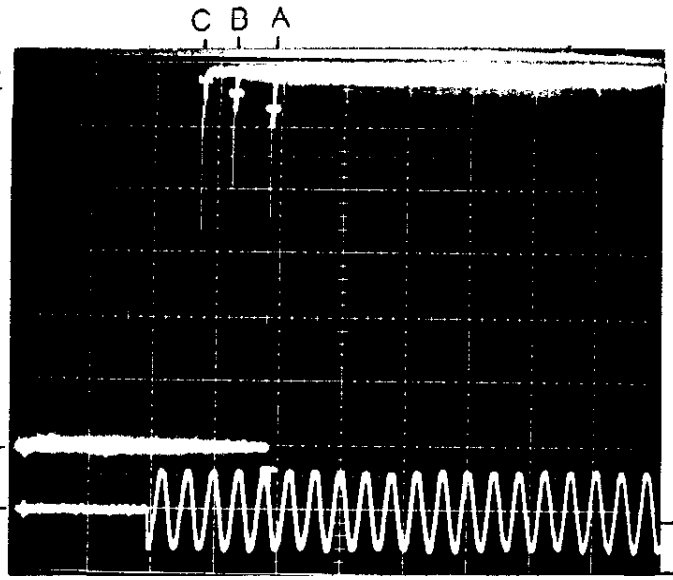
5V



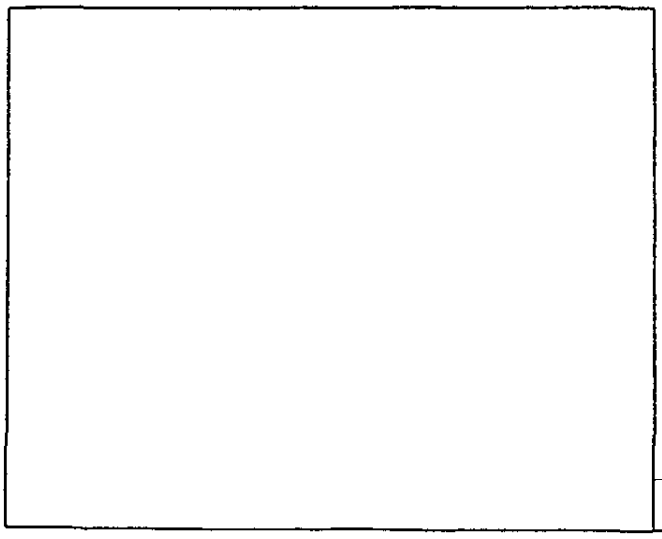
Iout: 0 %
Ta: 25°C

1V/DIV | 50ms/DIV

12V



2V/DIV | 50ms/DIV

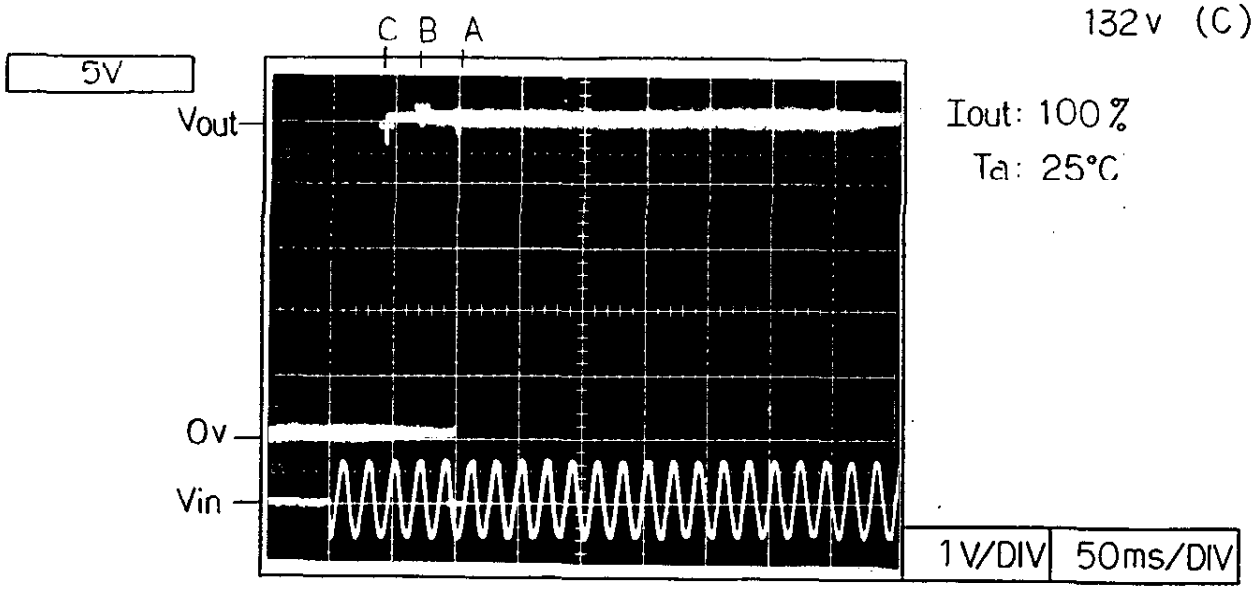


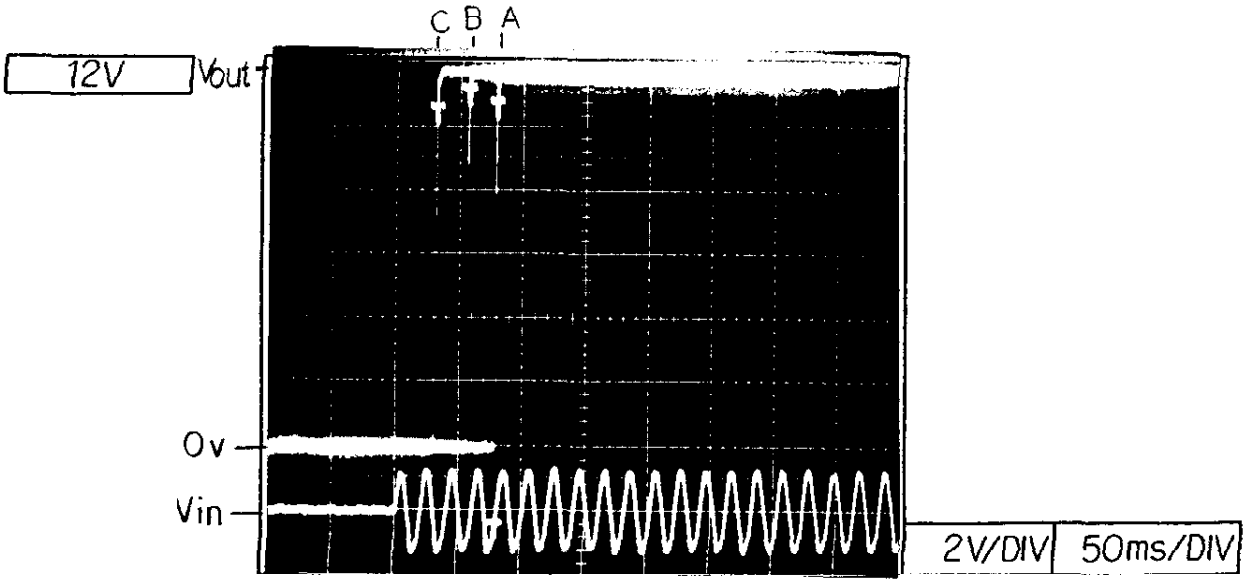
V/DIV | ms/DIV

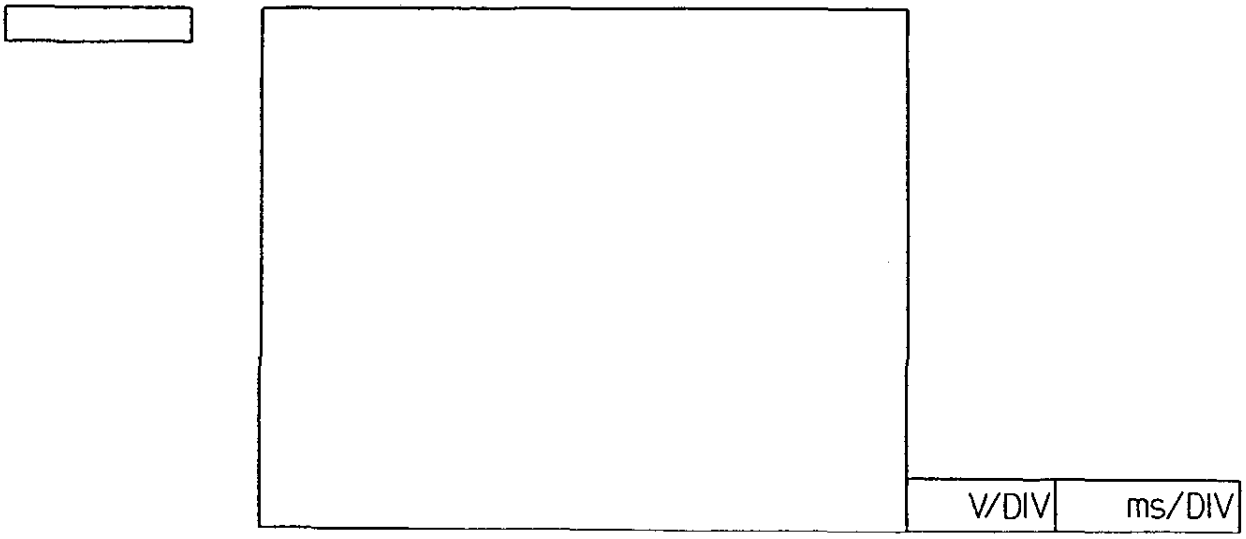
Output rise time

KS15

Conditions Vin: AC 85v (A)
100v (B)
132v (C)





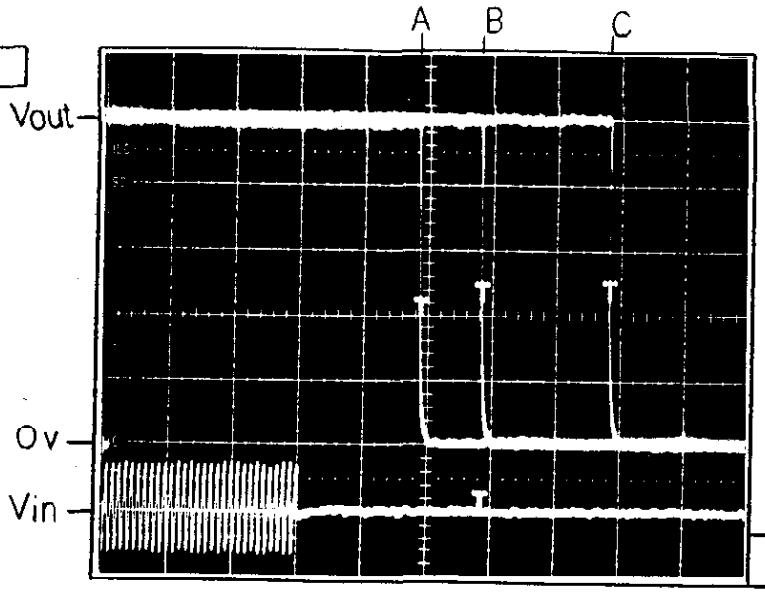


Output fall time

KS15

Conditions Vin: AC 85v (A)
100v (B)
132v (C)

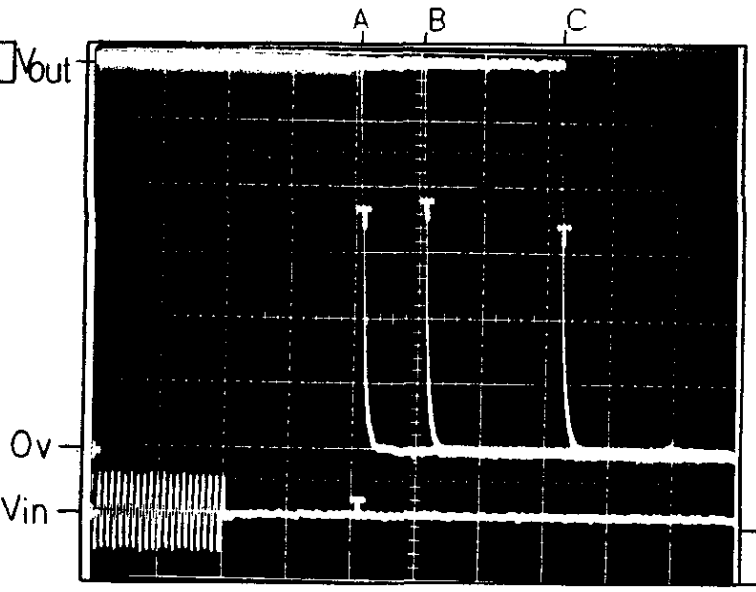
5V



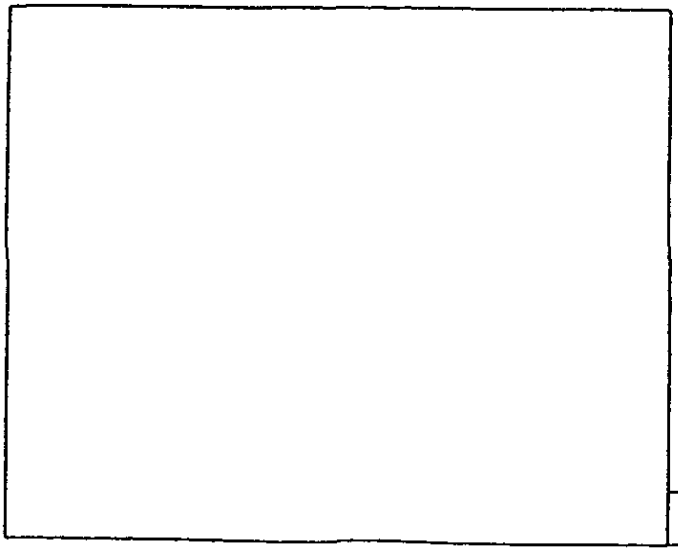
Iout: 0 %
Ta: 25°C

1V/DIV | 0.2s/DIV

12V



2V/DIV | 0.2s/DIV



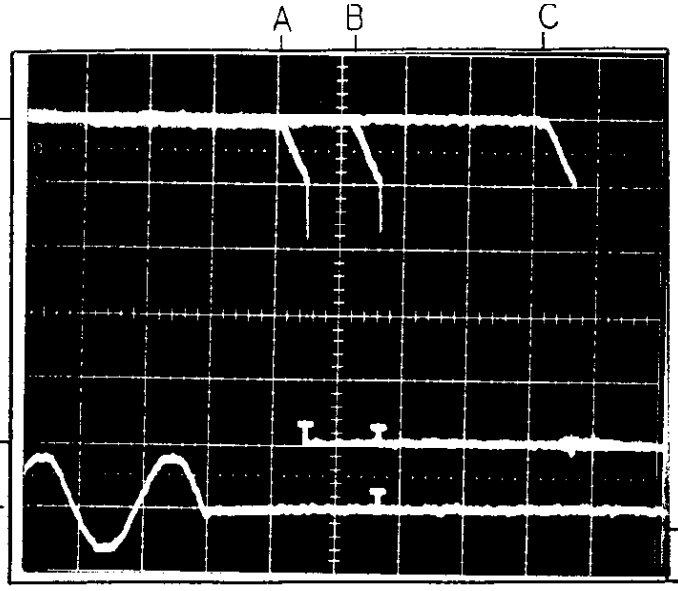
V/DIV | s/DIV

Output fall time

KS15

Conditions Vin: AC 85v (A)
100v (B)
132v (C)

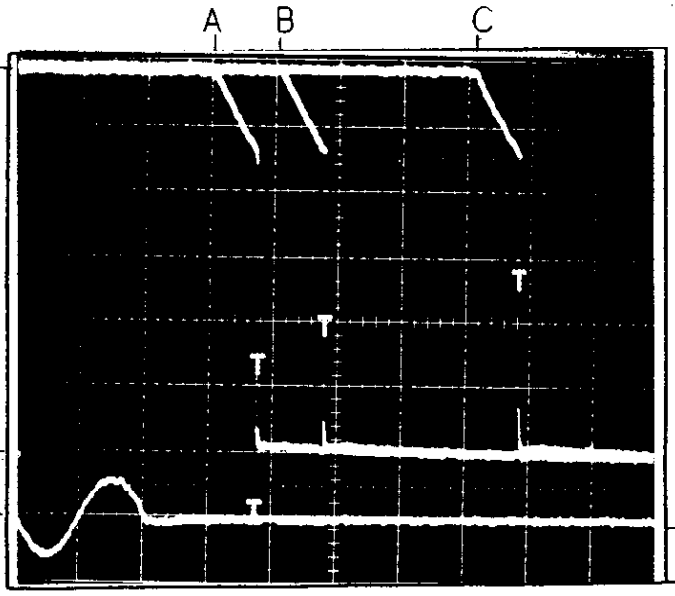
5V



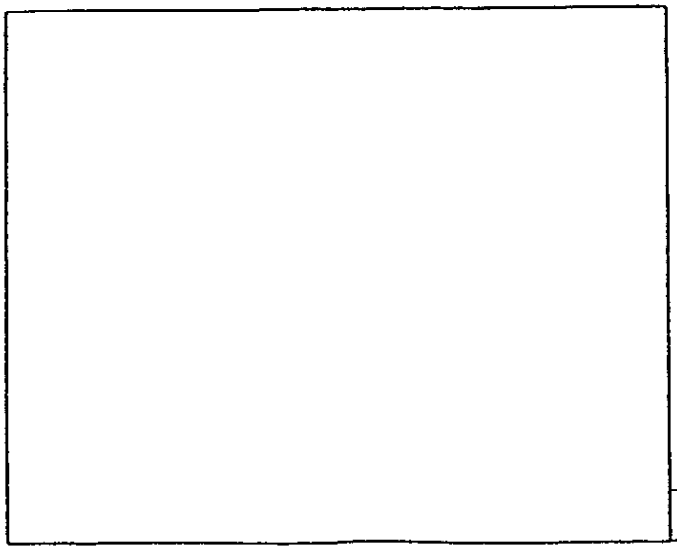
Iout: 100%
Ta: 25°C

1V/DIV | 10ms/DIV

12V



2V/DIV | 10ms/DIV



V/DIV | s/DIV

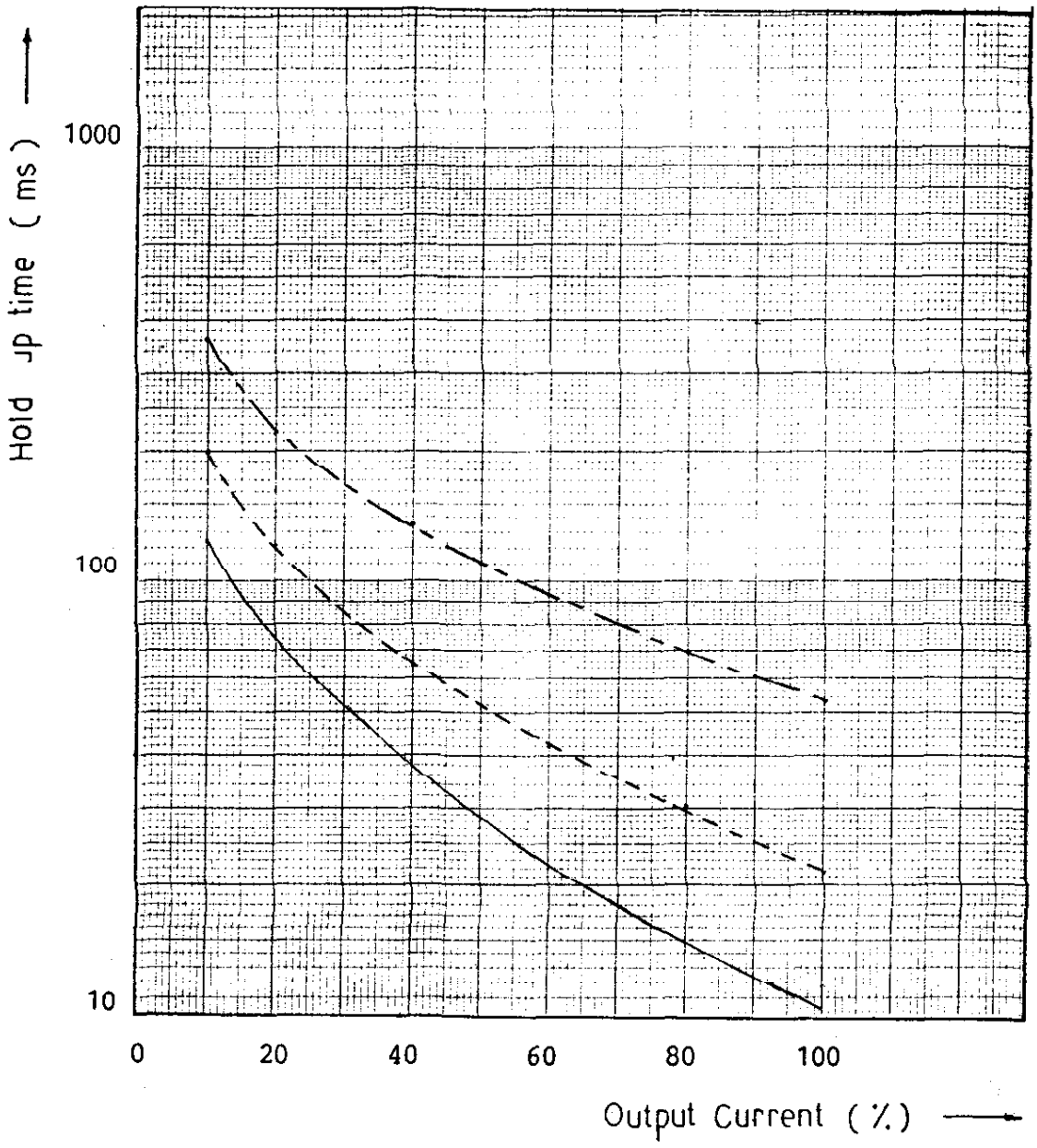
Hold Up Time

KS 15

5V

Vin : AC 85 v ——
AC 100 v – – –
AC 132 v —·—

Ta : 25°C



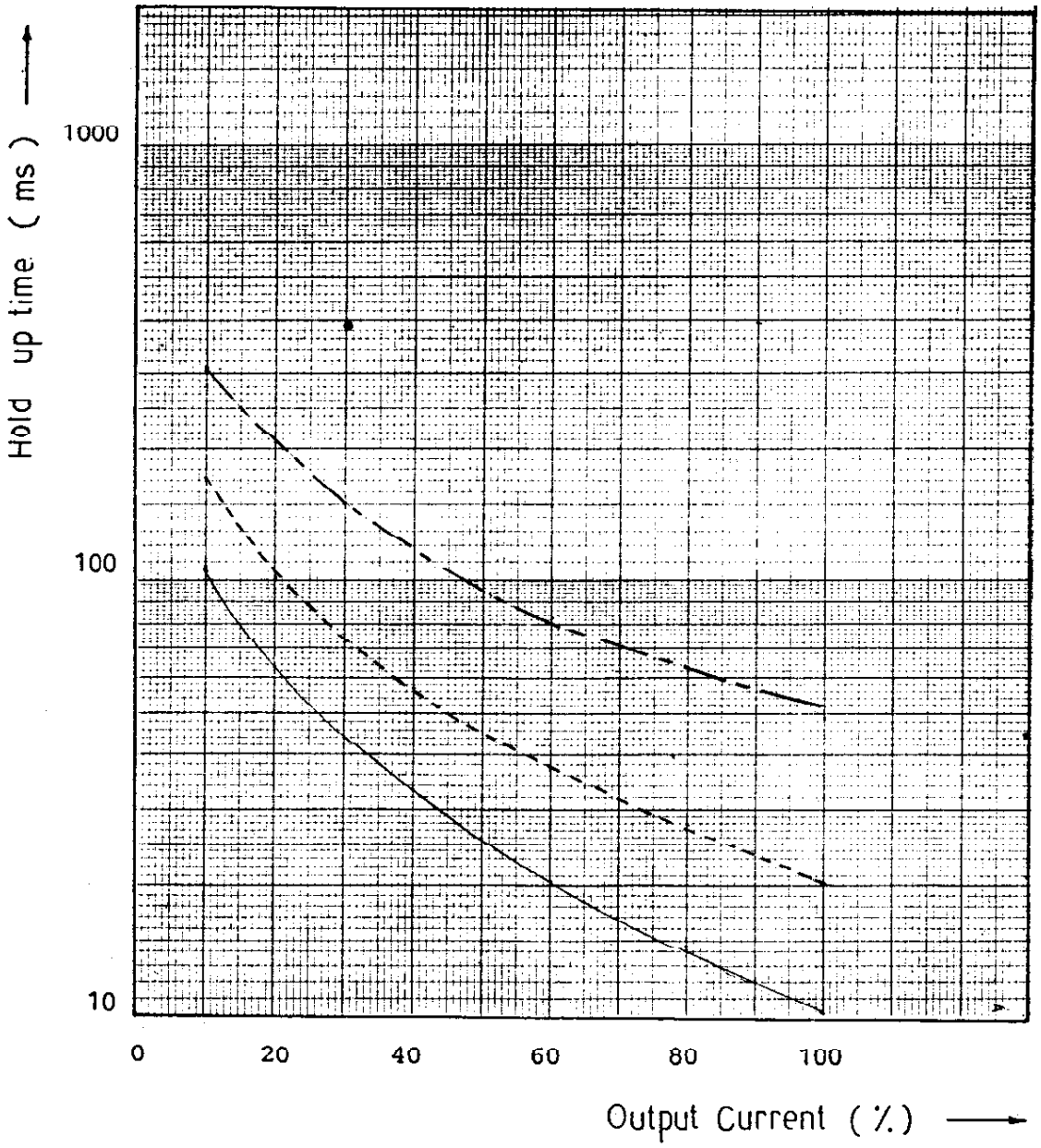
Hold Up Time

KS15

12V

Vin : AC 85 v ——
AC 100 v — — —
AC 132 v —·—·—

Ta : 25°C



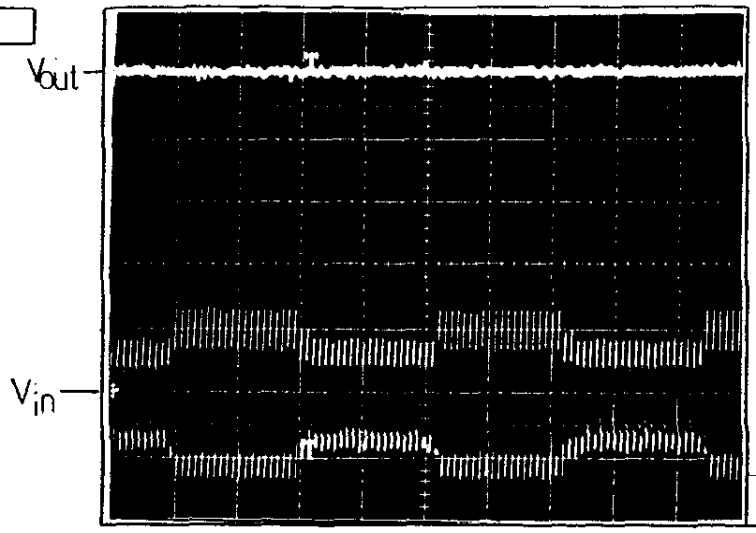
Dynamic line response

KS15

Vin : AC 85 v ═══ AC 132 v

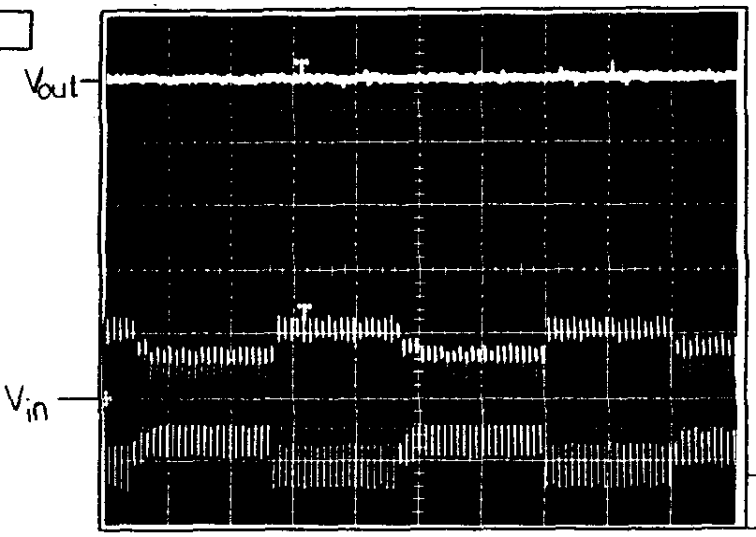
Conditions
Vout : Rated
Iout : 100%
Ta : 25°C

5V

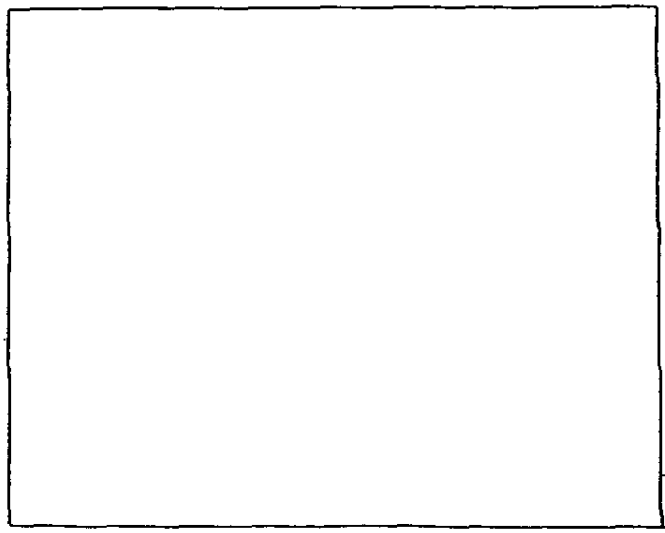


200mV/DIV | 0.2 s/DIV

12V



200mV/DIV | 0.2 s/DIV



0mV/DIV | 0.2 s/DIV

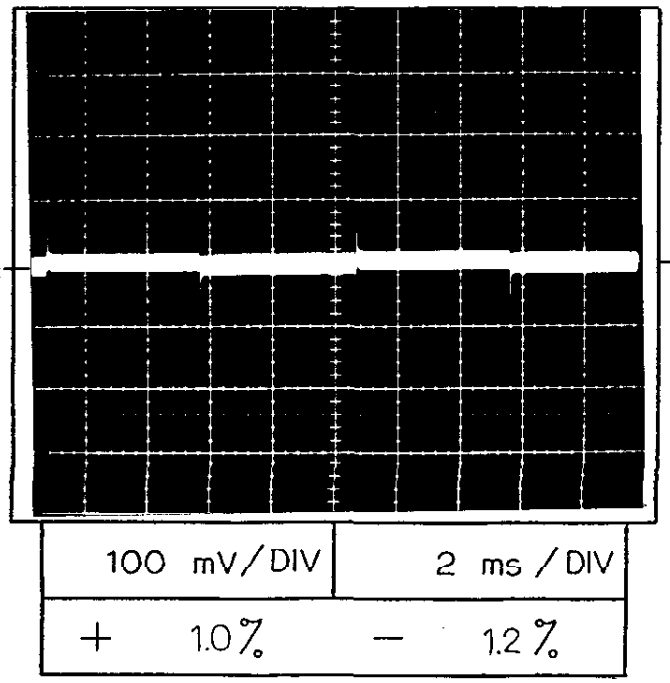
Dynamic load response

KS15

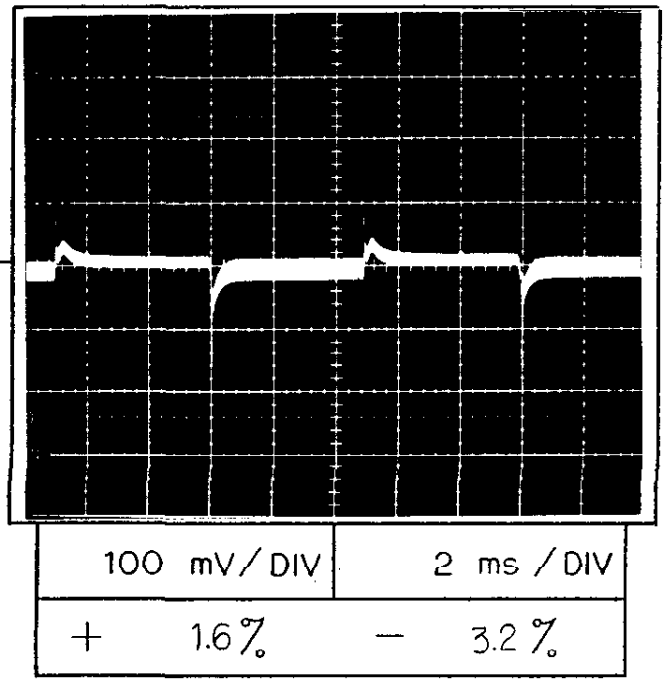
Conditions Vin : AC 100 v
Ta : 25°C

5V

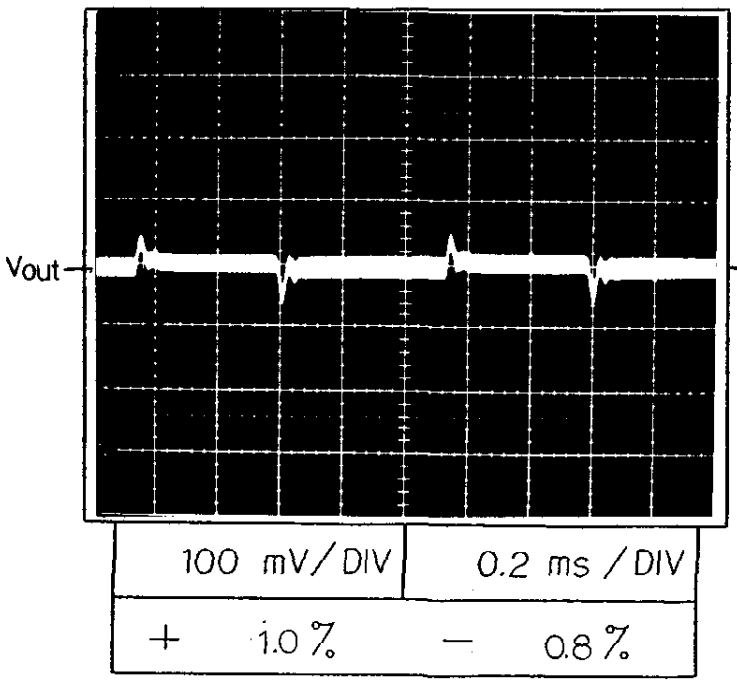
Iout 50 ⟷ 100% f=100Hz



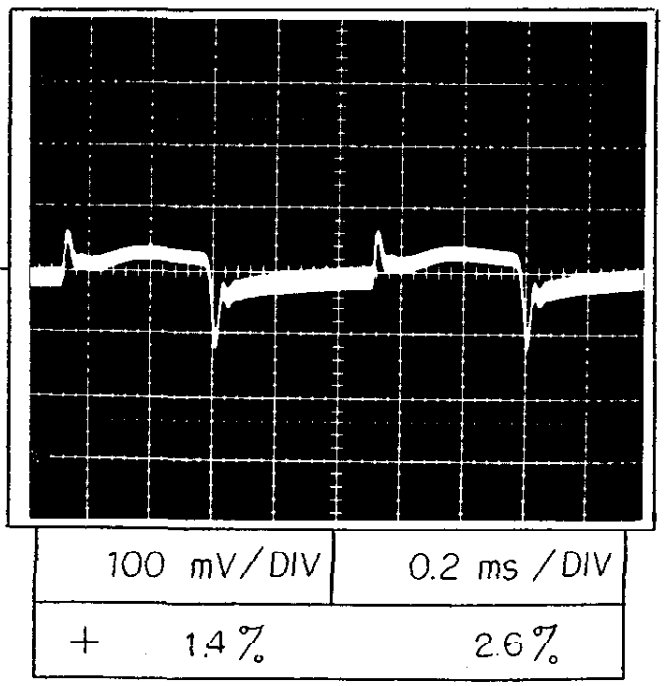
Iout 0 ⟷ 100% f=100Hz



Tout 50 ⟷ 100% f=1kHz



Iout 0 ⟷ 100% f=1kHz



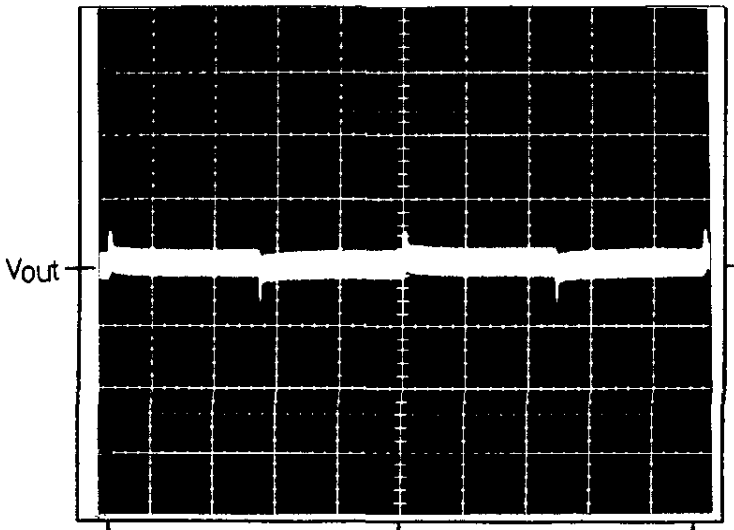
Dynamic load response

KS15

Conditions Vin : AC 100 v
Ta : 25°C

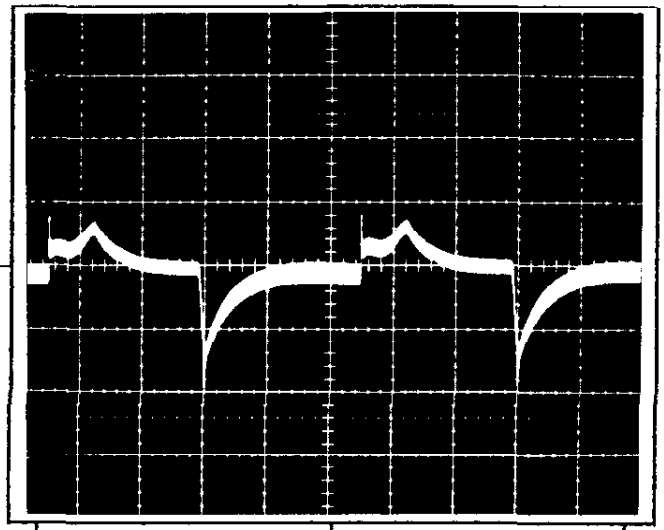
12V

Iout 50 ⟷ 100% f=100Hz



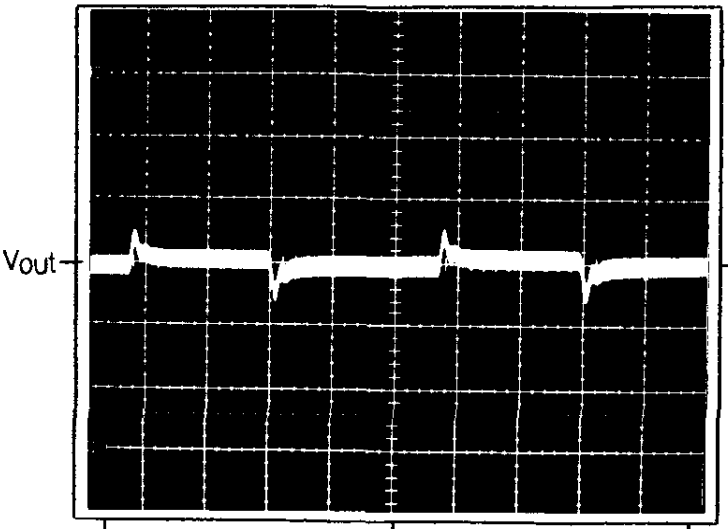
100 mV/DIV	2 ms/DIV
+ 0.5 %	− 0.6 %

Iout 0 ⟷ 100% f=100Hz



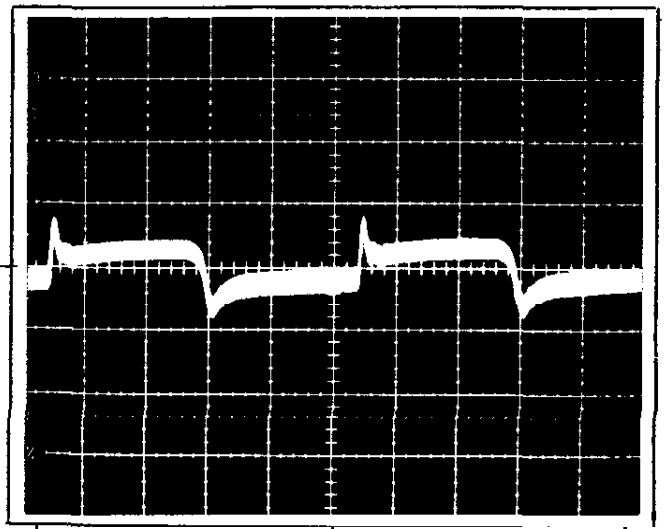
100 mV/DIV	2 ms/DIV
+ 0.7 %	− 1.7 %

Tout 50 ⟷ 100% f=1kHz



100 mV/DIV	0.2 ms/DIV
+ 0.5 %	− 0.5 %

Tout 0 ⟷ 100% f=1kHz



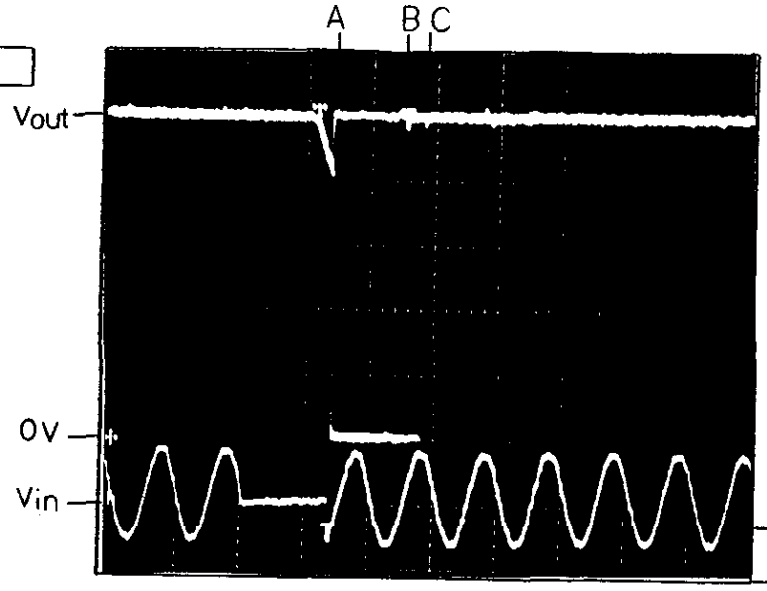
100 mV/DIV	0.2 ms/DIV
+ 0.7 %	− 0.7 %

Response to brown out

KS15

Conditions Vin : AC 100v
Iout : 100 %
Ta : 25°C

5V

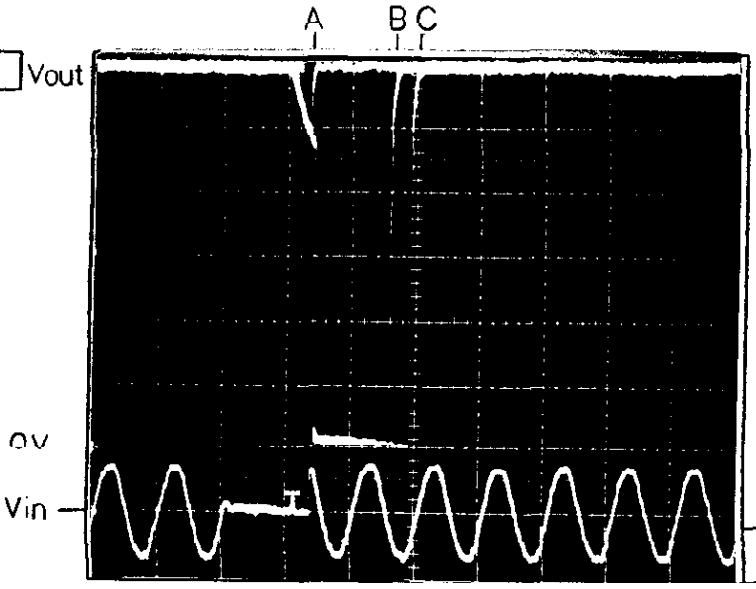


Brown out time

A : 26 ms
B : 27 ms
C : 36 ms

1V/DIV | 20ms/DIV

12V



A : 26 ms
B : 27 ms
C : 36 ms

2V/DIV | 20ms/DIV

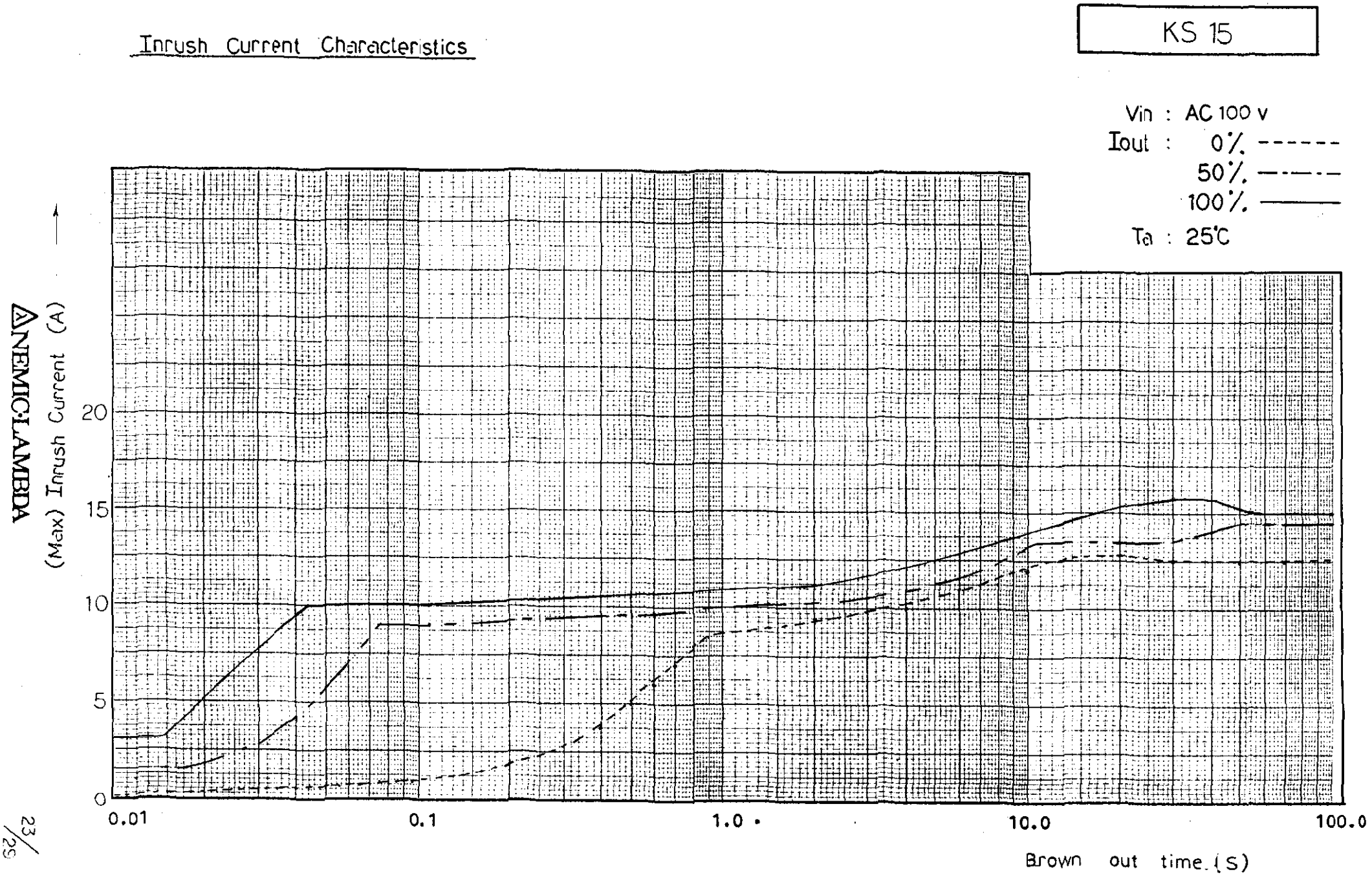
[ ]

A : ms
B : ms
C : ms

V/DIV | s/DIV

Inrush Current Characteristics

KS 15



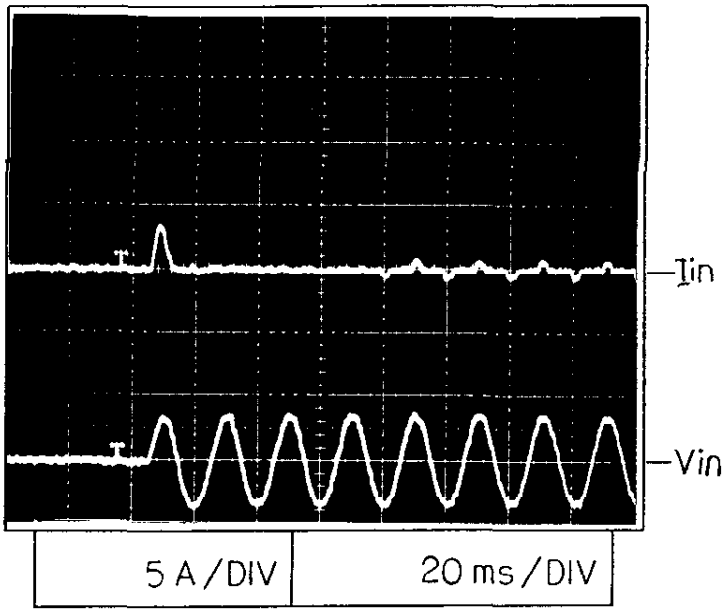
Inrush current waveform

KS15

Conditions Vin : AC 100 v
Iout : 100%
Ta : 25°C

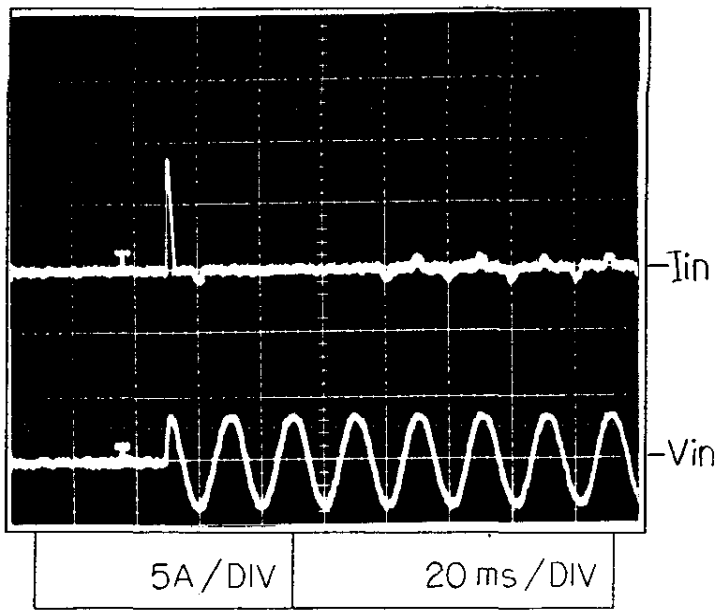
Switch on phase angle of input AC voltage

ϕ = 0°



Switch on phase angle of input AC voltage

ϕ = 90°



Leakage current

KS 15

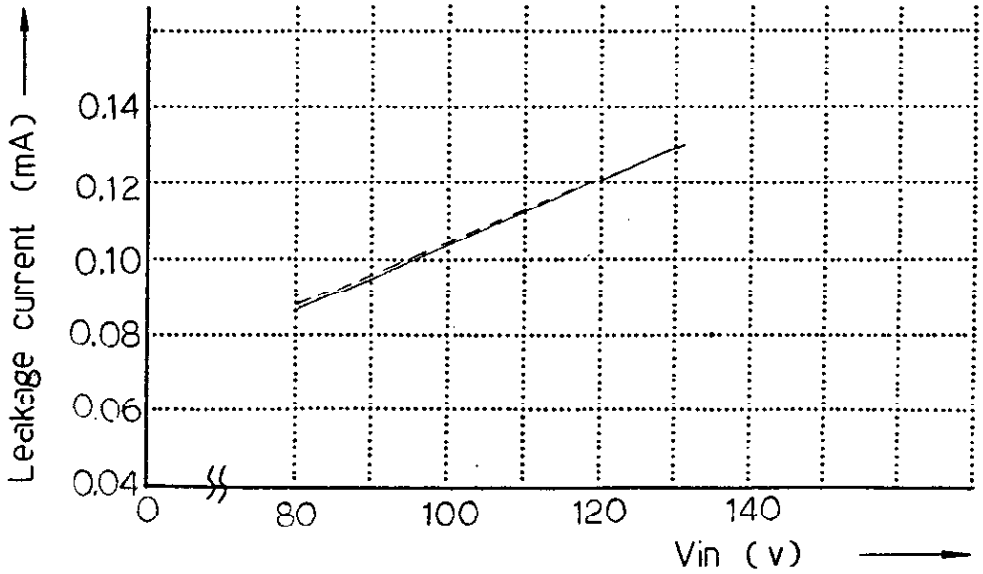
Conditions

Iout : 100 % ——

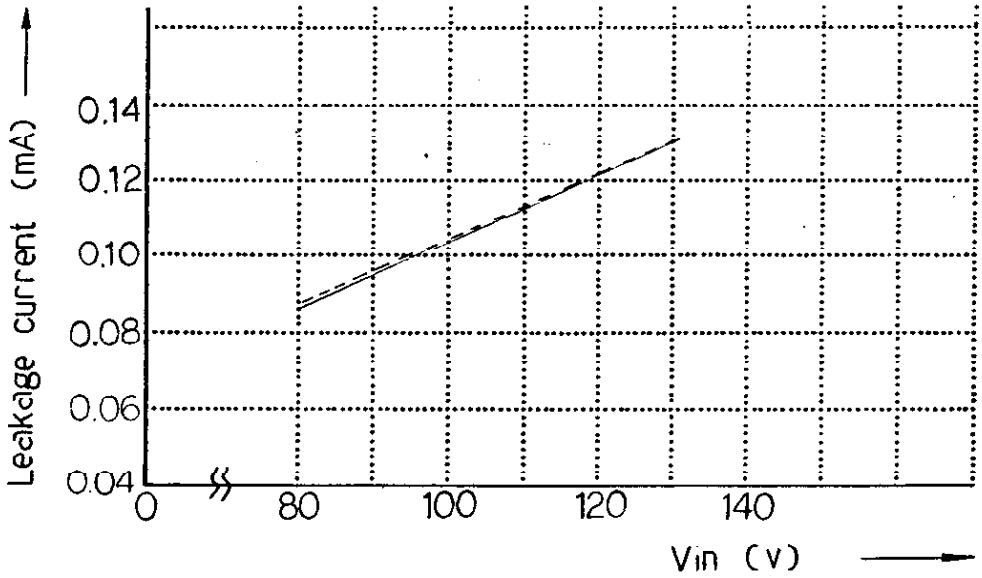
0 % - - - -

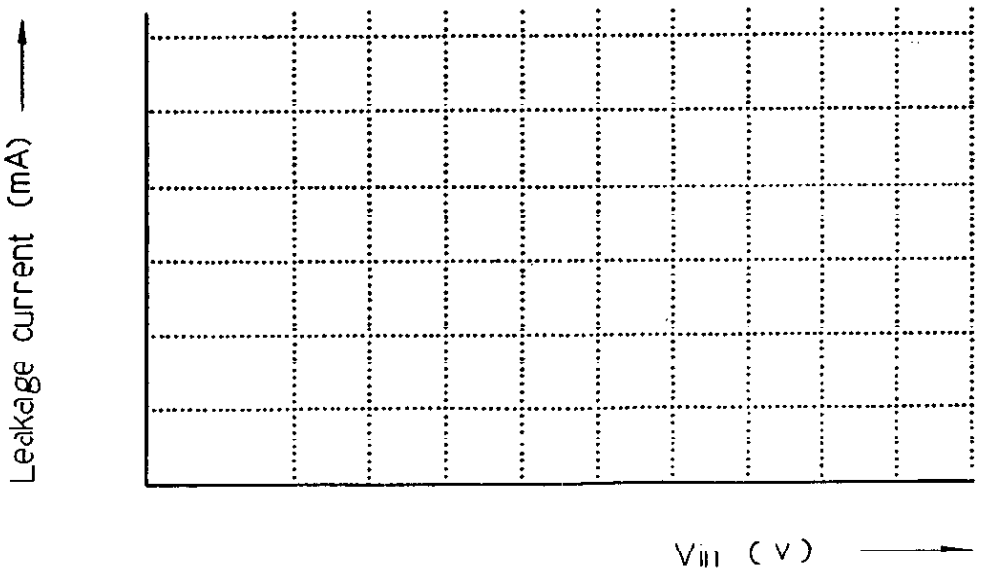
Ta : 25°C

5V



12V





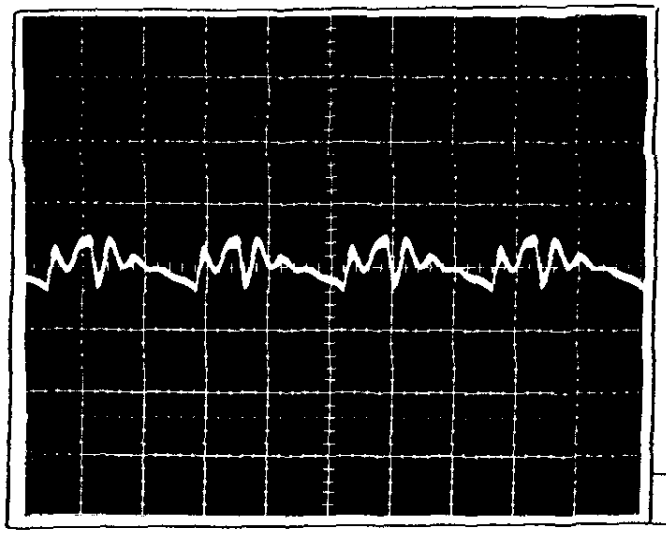
OUTPUT-RIPPLE, NOISE

KS15

Conditions Vin: AC 100 v
Iout: 100 %
Ta: 25°C

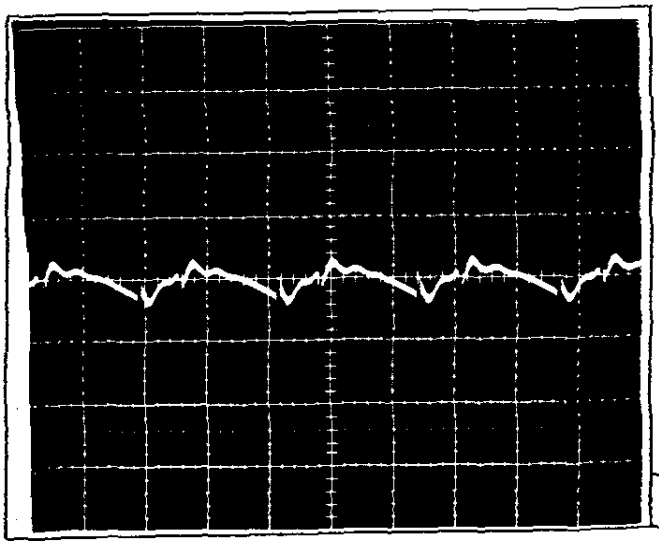
NORMAL MODE

5V

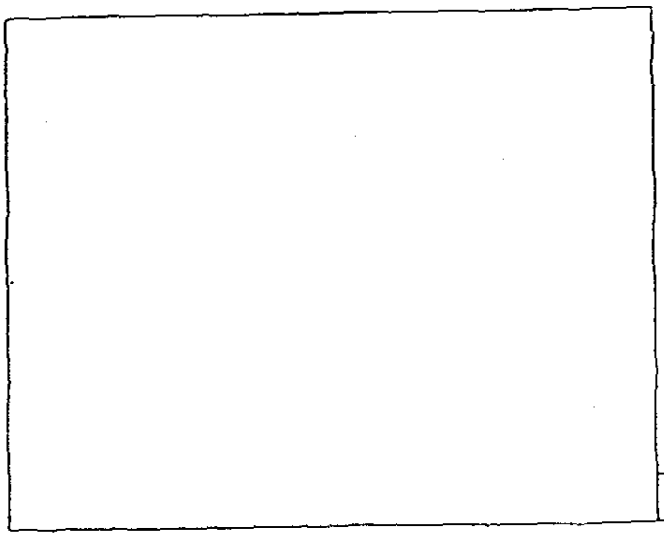


50mV/DIV | 2 µs/DIV

12V



50mV/DIV | 2µs/DIV



mV/DIV | µs/DIV

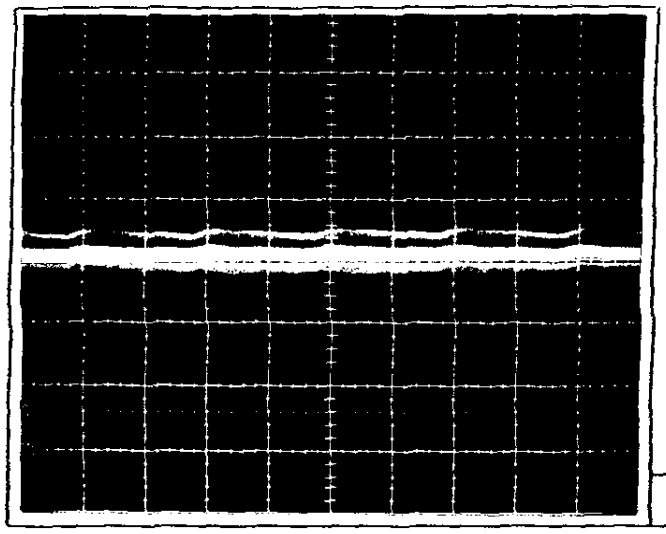
OUTPUT-RIPPLE , NOISE

KS15

Conditions Vin: AC 100 v
Iout: 100 %
Ta: 25°C

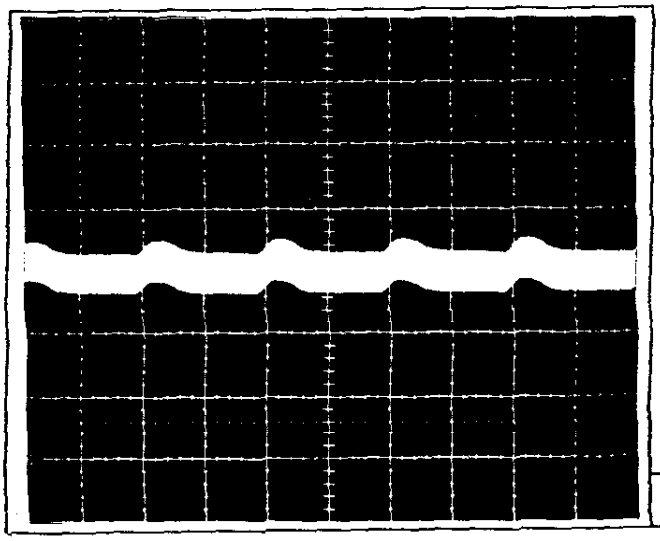
NORMAL MODE

5V

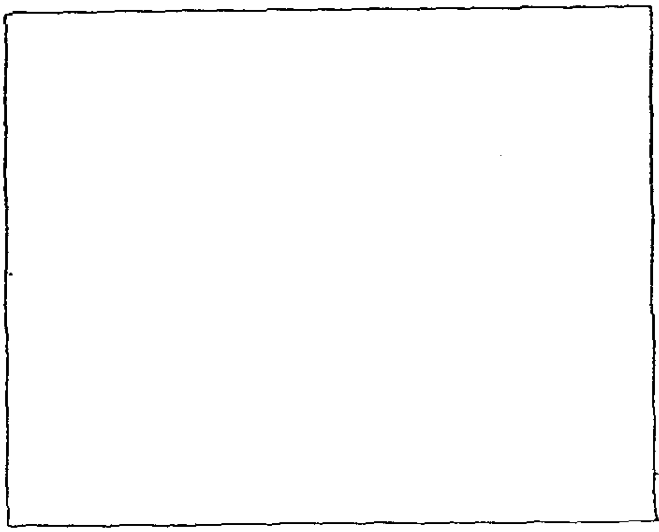


50mV/DIV | 5ms/DIV

12V



50mV/DIV | 5ms/DIV



mV/DIV | /DIV

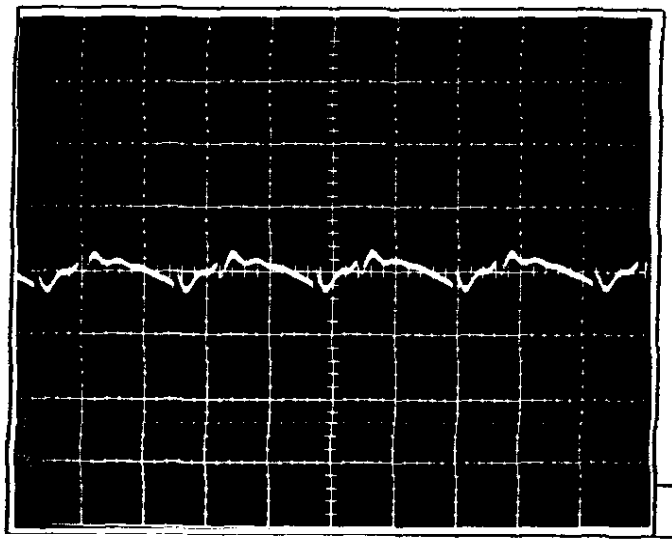
OUTPUT-RIPPLE, NOISE

KS15

Conditions Vin: AC 100v
Iout: 100 %
Ta: 25°C

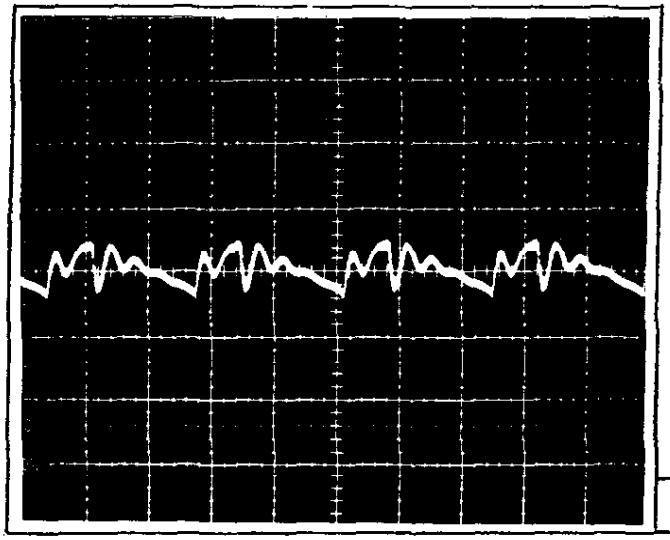
COMMON + NORMAL MODE

5V

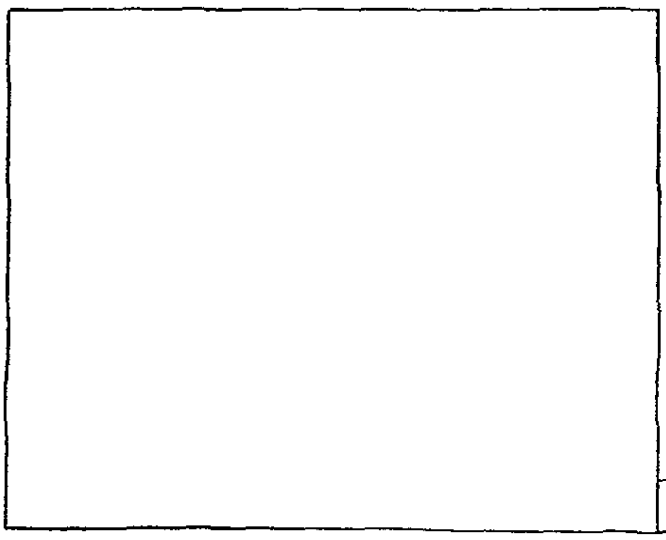


50mV/DIV | 2μs/DIV

12V



50mV/DIV | 2μs/DIV



mV/DIV | μs/DIV

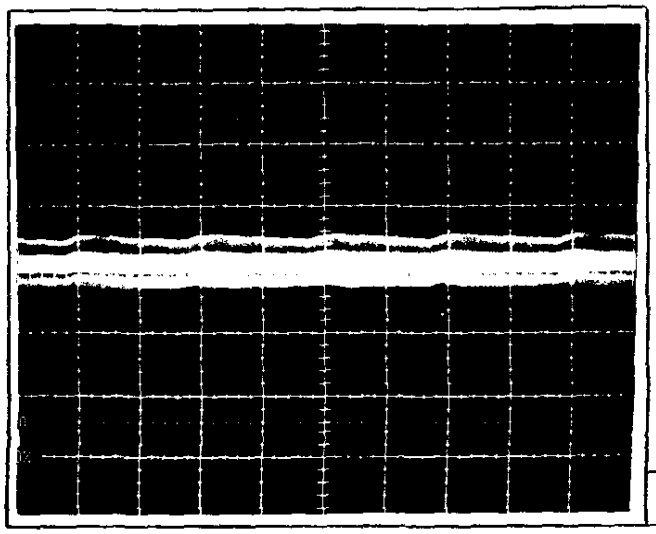
OUTPUT-RIPPLE, NOISE

KS15

Conditions Vin. AC 100 v
Iout: 100 %
Ta: 25°C

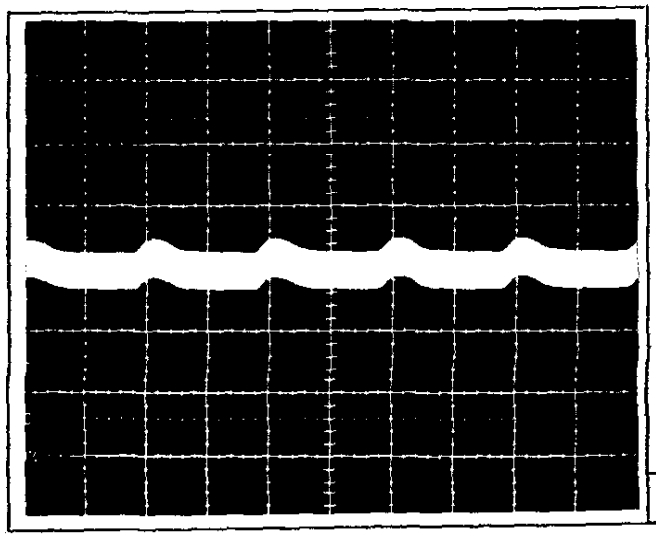
COMMON + NORMAL MODE

5V

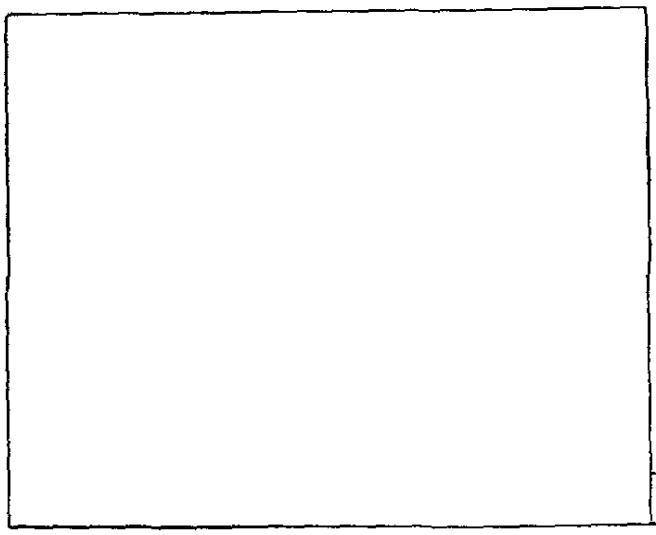


50mV/DIV | 5ms/DIV

12V



50mV/DIV | 5ms/DIV



mV/DIV | s/DIV