

FULL-WAVE RECTIFIER

EZ81

Indirectly heated full-wave rectifier with 6.3V heater.

HEATER

V_h	6.3	V
I_h	1.0	A

LIMITING VALUES

P.I.V. max.	1.3	kV ←
$i_{a(pk)}$ max.	500	mA ←
$i_{a(surge)}$ max.	1.8	A ←
V_{n-k} max. (cathode positive)	500	V

Capacitor input

I_{out} max.	} See rating chart 1
$V_{in(r.m.s.)}$ max.	
R_{lim} min.	See rating charts 2 and 3 and capacitor input regulation curves.

Choke input

I_{out} max.	} See rating chart 1
$V_{in(r.m.s.)}$ max.	
L_{min} (at 50c/s)	See choke regulation curves

CHARACTERISTIC

Anode voltage drop ($I_{out} = 150mA$)	19.8	V
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OPERATING CONDITIONS

Capacitor input

$V_{in(r.m.s.)}$	2×250	2×350	2×450	V
R_{lim} (per anode)	150	230	310	Ω
C	50	50	50	μF
I_{out}	160	150	100	mA
V_{out}	245	352	497	V

Choke input

$V_{in(r.m.s.)}$	2×250	2×350	2×450	V
L	10	10	10	H
I_{out}	180	180	150	mA
V_{out}	199	288	378	V

OPERATING NOTES

The design of a power circuit starts with a knowledge of the output conditions and from this information the transformer and secondary or input voltage can be chosen. Reference to the rating charts will indicate whether a rectifier is suitable for a particular application.

Rating chart 1

This shows all the combinations of input voltage and output current considered safe for both capacitor and choke input filters.

Rating chart 2

This chart shows the minimum series resistor per anode necessary to restrict the maximum switching surge in a capacitor input filter, to its limiting value over the range of supply voltages.

Rating chart 3

This shows the relationship between the maximum rectification efficiency and output current.

Capacitor input filter circuits

Reference should be made to rating charts 2 and 3 and the regulation curves. The circuit is set up and the input and output voltage and output current are measured. If the operating conditions lie within the boundary lines of the regulation curves, an improvement in the rectification efficiency may be effected by reducing the value of the limiting resistance. Rating chart 2 gives the minimum value of the limiting resistance against open circuit secondary voltage; this resistance will guard against excessive switching currents.

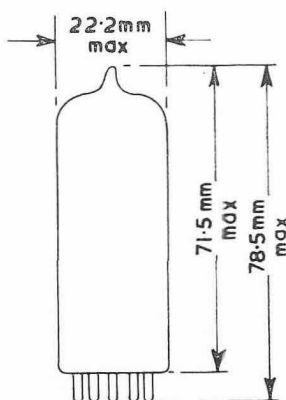
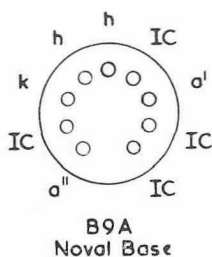
Comparison of the calculated rectification efficiency $\frac{V_{out}}{\sqrt{2} \times V_{in(r.m.s.)}}$

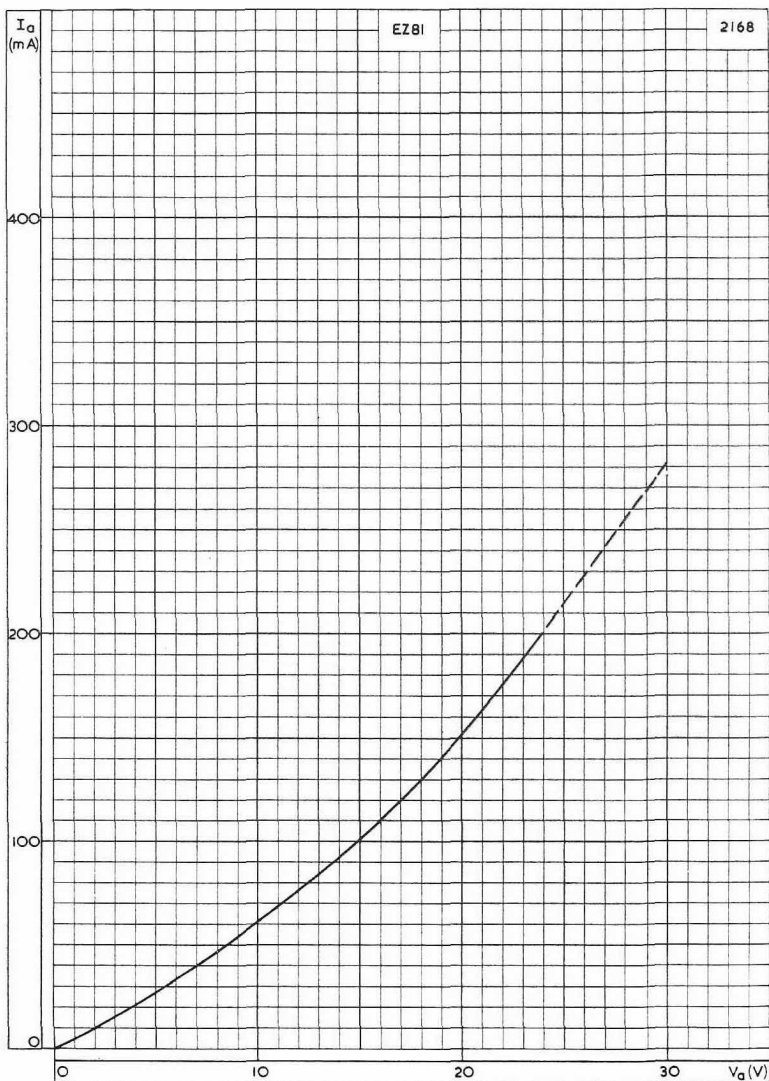
with rating chart 3 will show whether the limiting resistance must be increased to lower the rectification efficiency to the area of safe operation. Operation within this area indicates that the limiting value $I_{a(pk)}$ has not been exceeded.

Choke input circuit

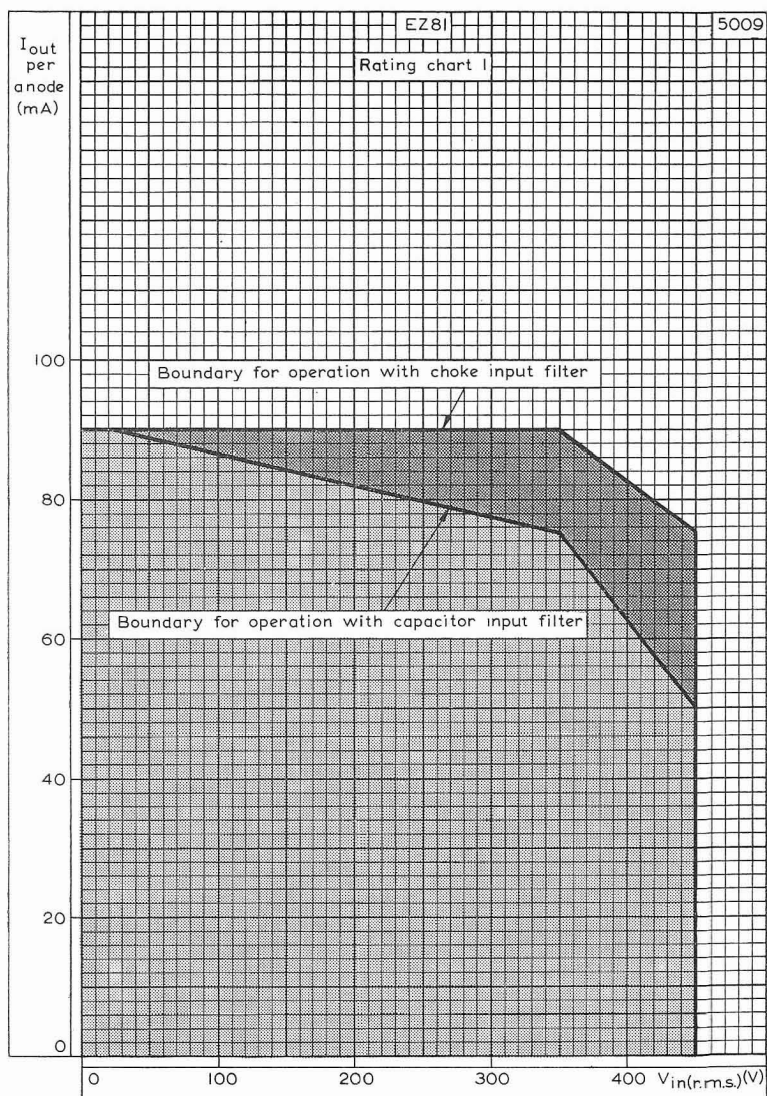
Reference should be made to rating chart 1. A suitable value of choke can be obtained from the choke regulation curves.

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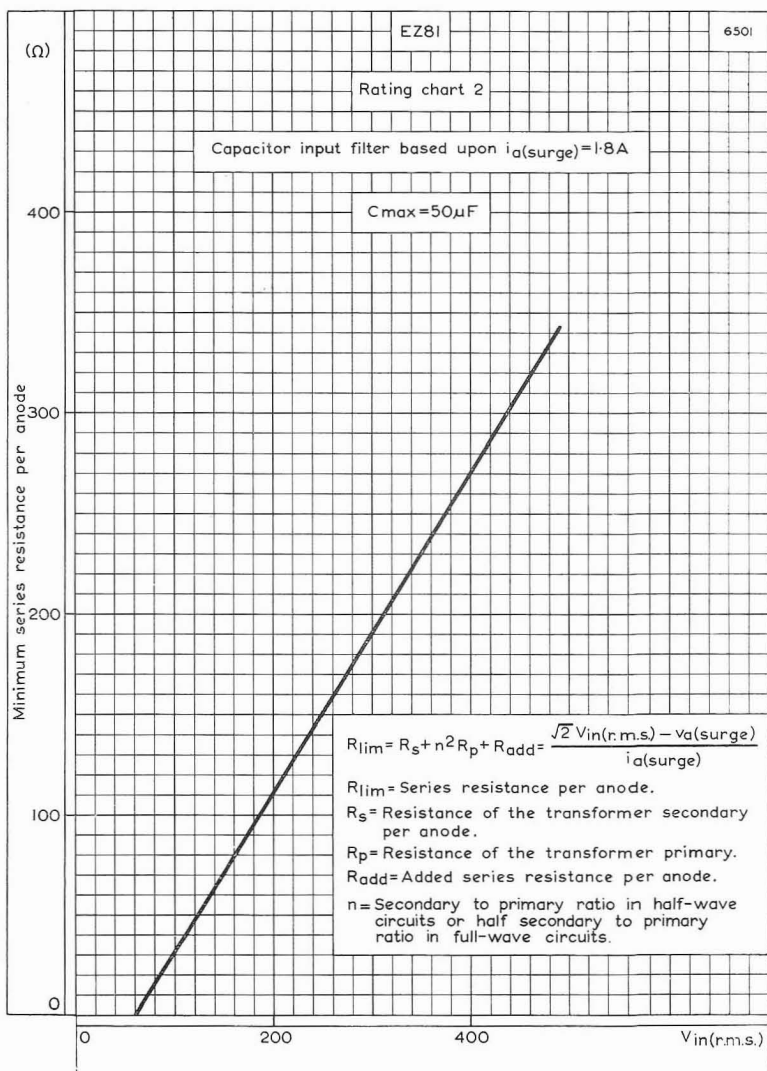




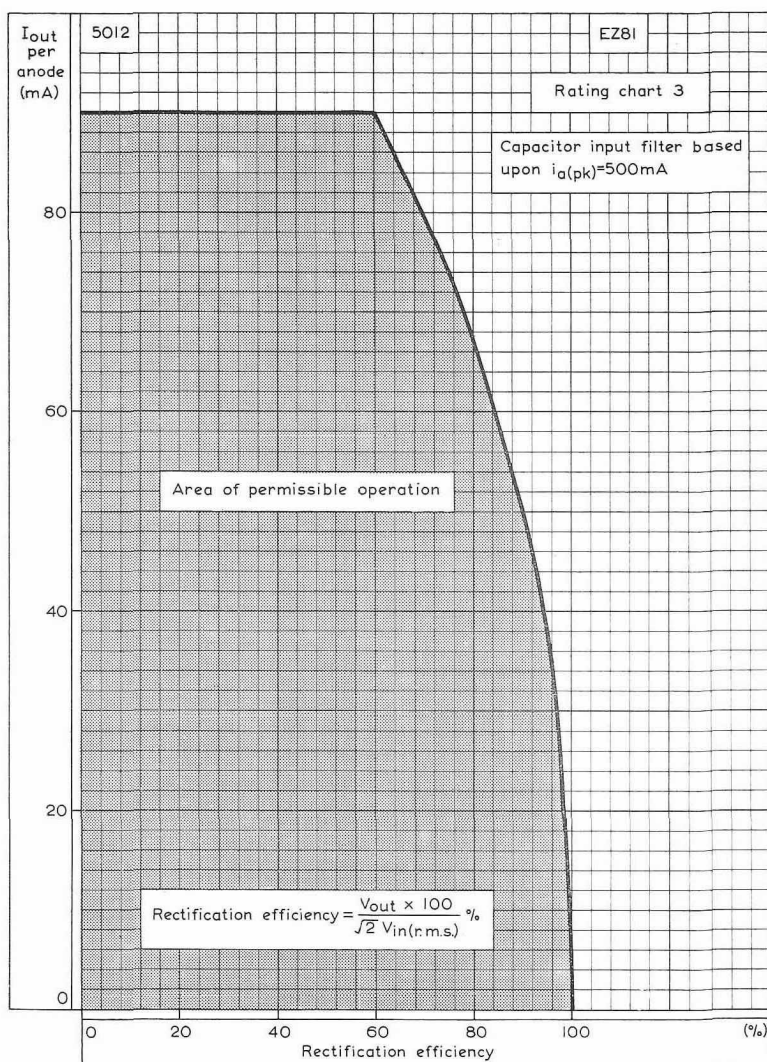
ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE



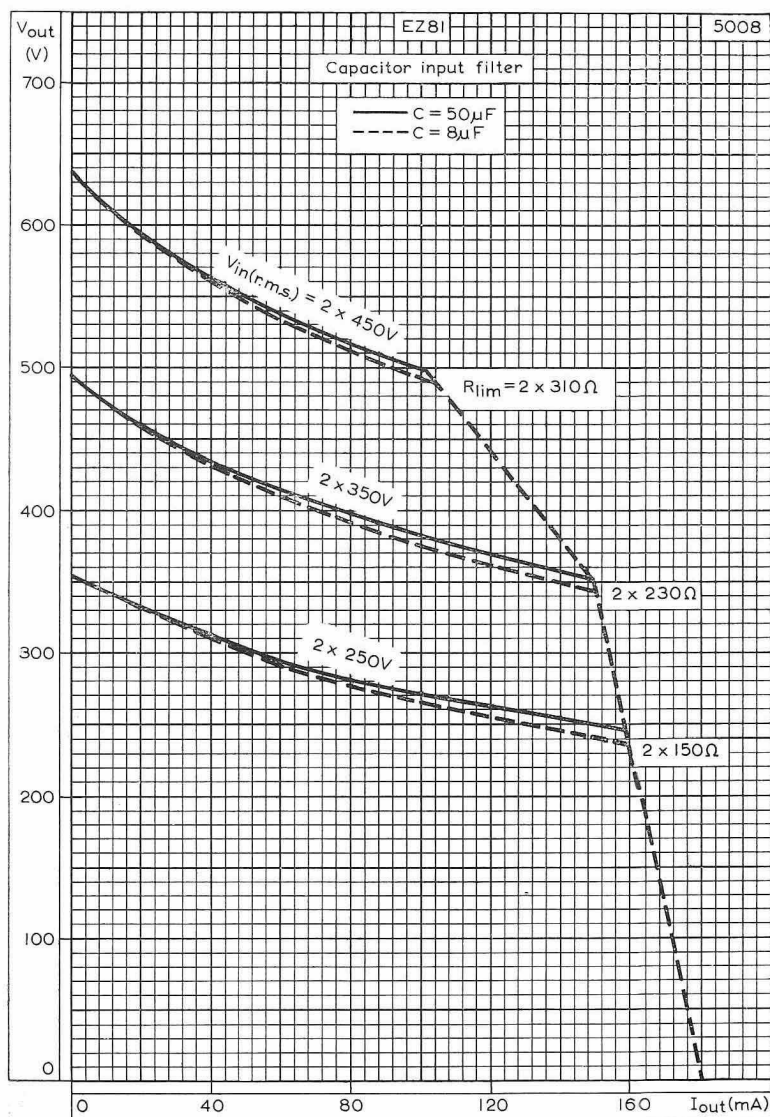
BOUNDARY OF OPERATION WITH CAPACITOR OR
CHOKE INPUT FILTER



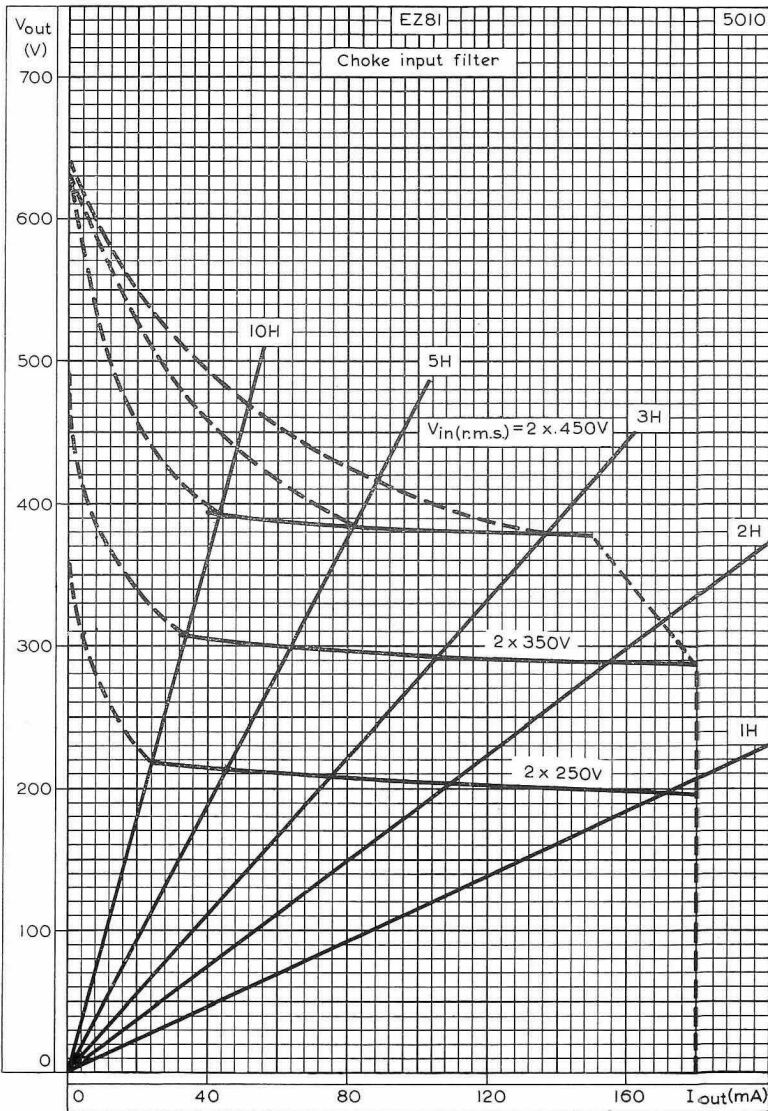
MINIMUM SERIES ANODE RESISTANCE PLOTTED AGAINST
OPEN CIRCUIT SECONDARY VOLTAGE



OUTPUT CURRENT PER ANODE PLOTTED AGAINST
RECTIFICATION EFFICIENCY



CAPACITOR INPUT FILTER REGULATION CURVES



CHOKE INPUT FILTER REGULATION CURVES

