

SPECIAL QUALITY HIGH SLOPE PENTODE

E83F

Special quality high slope pentode for use in general industrial applications where stability of characteristics and long life are required.

This data should be read in conjunction with GENERAL NOTES—SPECIAL QUALITY VALVES, which precede this section of the handbook and the index numbers are used to indicate where reference should be made to a specific note.

HEATER

Suitable for series or parallel operation, a.c. or d.c.

V_h^1	6.3	V
I_h	300	mA

The maximum variation of heater current at $V_h=6.3V$ is $\pm 15mA$.

In order to achieve a useful valve life with the heater in a series connected chain the absolute maximum variation of heater current due to voltage fluctuations and component tolerances should be $< \pm 1.5\%$.

MOUNTING POSITION

Any

CAPACITANCES² (measured without an external shield)

$C_{in} \text{ a.v.}$	8.0	pF
$C_{in} \text{ max.}$	8.7	pF
$C_{out} \text{ a.v.}$	3.6	pF
$C_{out} \text{ max.}$	4.2	pF
C_{a-g1}	< 0.015	pF
C_{g1-h}	< 0.15	pF
C_{h-k}	4.0	pF
$C_{in} (I_k=12.1mA)$	10.8	pF
* $C_{g1-shield}$	< 0.025	pF
* $C_{a-shield}$	< 0.025	pF

*Capacitance of the electrode to a surrounding shield with an inner diameter of 52mm and a height of 98mm, all other electrodes being earthed.

CHARACTERISTICS³

V_{a-k}	210	V
V_{g2-k}	0	V
V_{g1-k}	120	V
R_k	165	Ω
* I_a	10 ± 1.3	mA
* I_{g2}	2.1 ± 0.4	mA
* g_m	9.0 ± 1.2	mA/V
r_a	500	k Ω
$r_a \text{ min.}$	300	k Ω
μ_{g1-g2}	34	
$R_{eq} \text{ (r.f.)}$	750	Ω
$R_{eq} \text{ max. (r.f.)}$	1.0	k Ω
$R_{eq} \text{ max. (f=0 to 10kc/s)}$	36	k Ω
* $I_{g1} \text{ max. (R}_{g1}=100k\Omega)$	0.5	μA
$V_{g1-k} \text{ max. (I}_a=500\mu A)$	-5.25	V

*To allow for valve deterioration during life, circuits should be designed to function with a valve in which one or more of these characteristics have changed to the following values:-

I_a	7.0	mA
I_{g2}	1.25	mA
g_m	6.4	mA/V
* $I_{g1} (R_{g1}=100k\Omega)$	1.0	μA



OPERATING CONDITIONS AS CLASS "A" AMPLIFIER

V_{a-k}	120	210	V
V_{g3-k}	0	0	V
$V_{g2(b)}$	120	120	V
R_k	180	180	Ω
R_a	10	20	$k\Omega$
R_{g2}	5.6	5.6	$k\Omega$
I_a	8.3	8.3	mA
I_{g2}	1.7	1.7	mA
g_m	8.2	8.2	mA/V
r_a	420	440	$k\Omega$
V_{in} (r.m.s.)	1.1	1.1	V
V_{in} (r.m.s.) ($P_{out}=50mW$)	350	250	mV
P_{out}	340	660	mW
* $P_{out}(I_{g1}=+0.3\mu A)$	400	870	mW
D_{tot}	10	10	%

*Measured with $R_{g1}=330k\Omega$

INSULATION

Between heater and cathode

V_a	6.3	V
V_{h-k}	100	V
Series resistor	1.0	M Ω
Leakage current	<15	μA

Between any two arbitrary electrodes

>100 M Ω

LIMITING VALUES (design centre ratings)

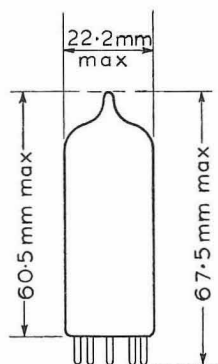
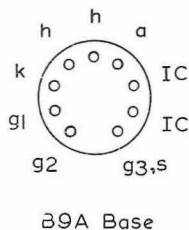
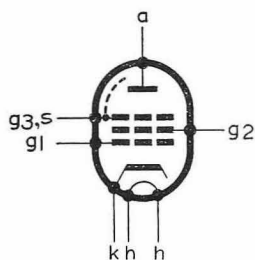
$V_{a(b)}$ max.	550	V
V_a max.	210	V
p_a max.	2.1	W
$V_{g2(b)}$ max.	550	V
V_{g2} max.	210	V
p_{g2} max.	350	mW
I_k max.	16	mA
* $i_{k(pk)}$ max.	80	mA
V_{g1} max. ($I_{g1}=+0.3\mu A$)	-1.1	V
- V_{g1} max.	100	V
-* $v_{g1(pk)}$ max.	200	V
p_{g1} max.	50	mW
R_{g1-k} max. (cathode bias)	1.0	M Ω
V_{h-k} max.	100	V
R_{h-k} max.	20	$k\Omega$
T_{bulb} max. (absolute rating)	170	$^{\circ}C$

*Max. duty cycle=10%, max. pulse duration=200 μs

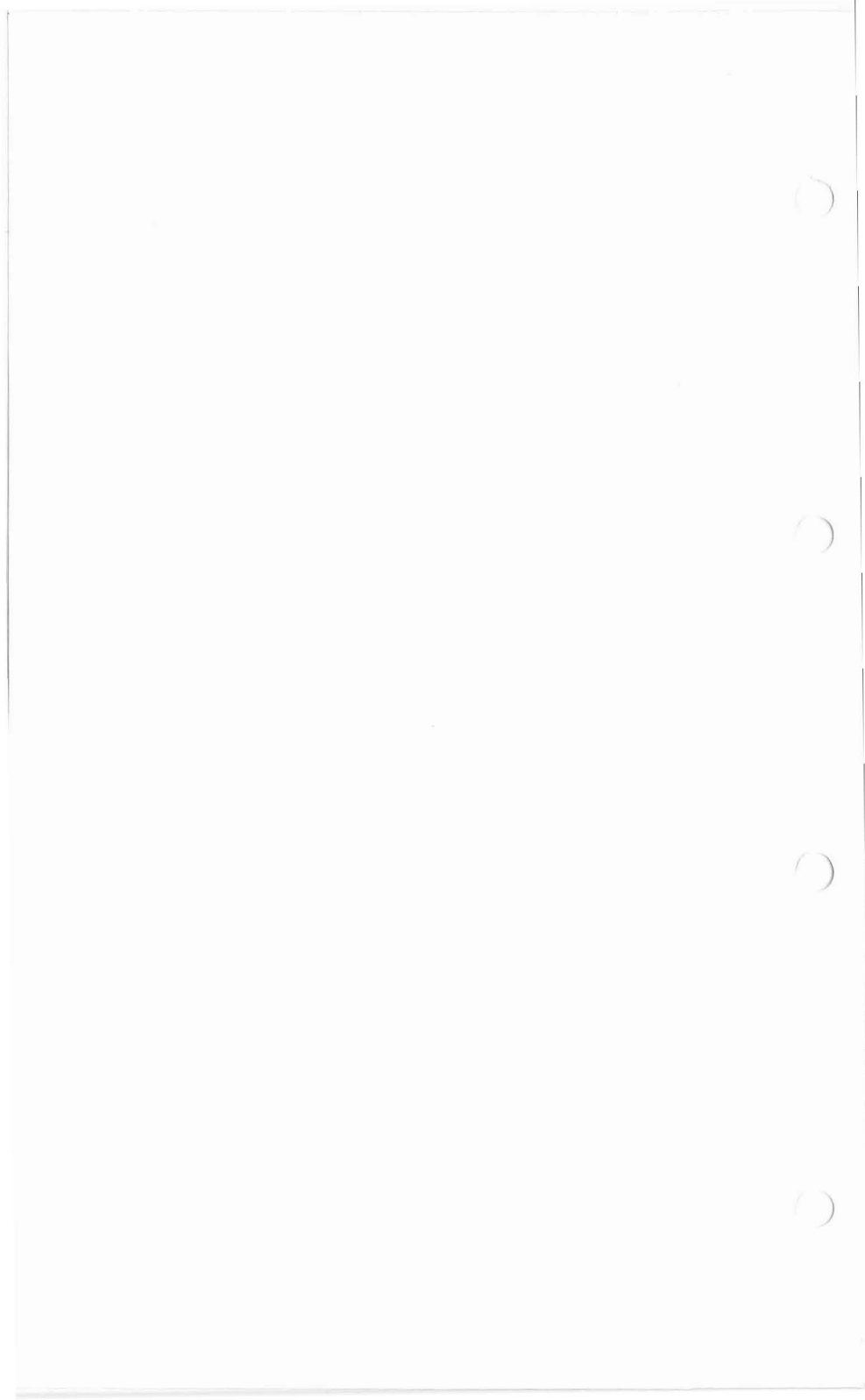
OPERATING NOTES

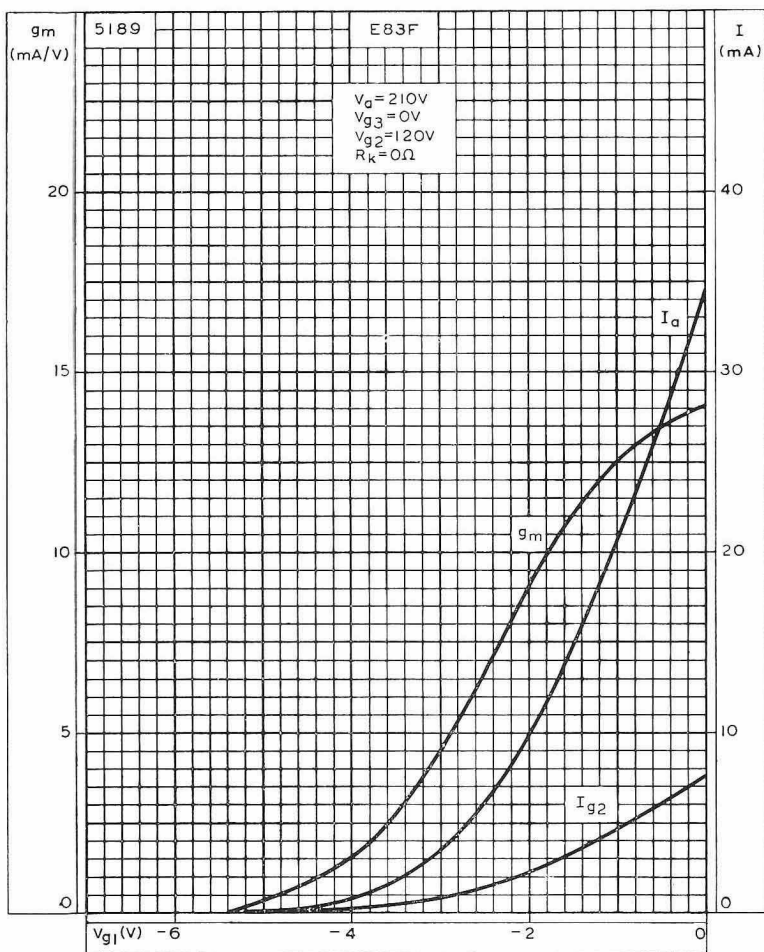
The hum voltage referred to g_1 has a maximum value of 500 μV (r.m.s.) with a grid leak of 500k Ω .

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The bulb and base dimensions of this valve are in accordance with BS448, Section B9A

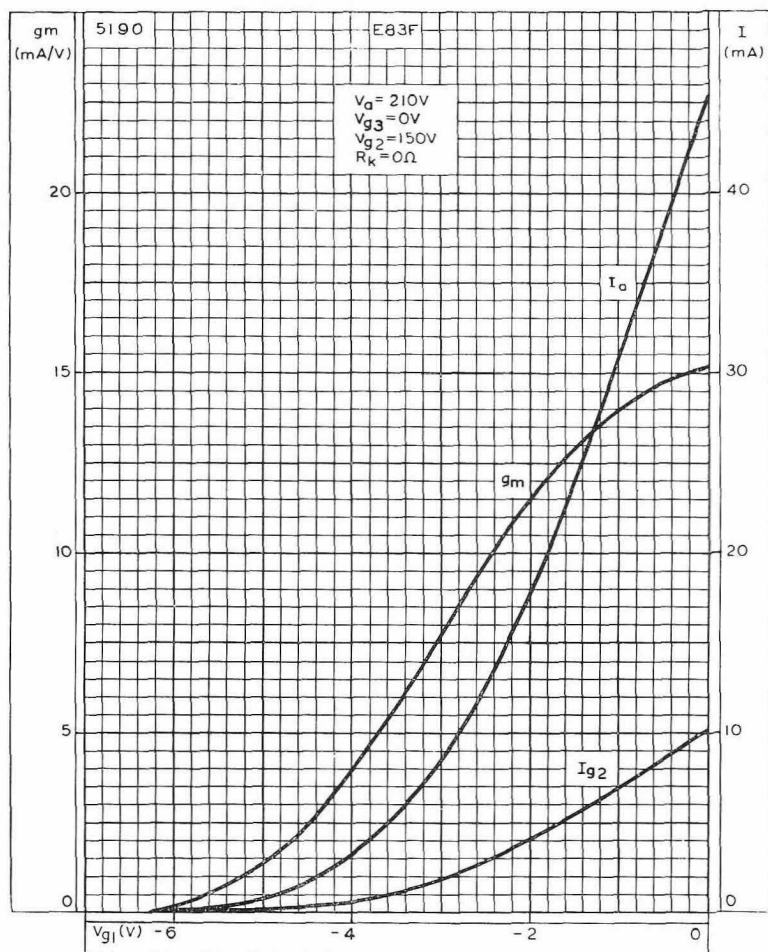




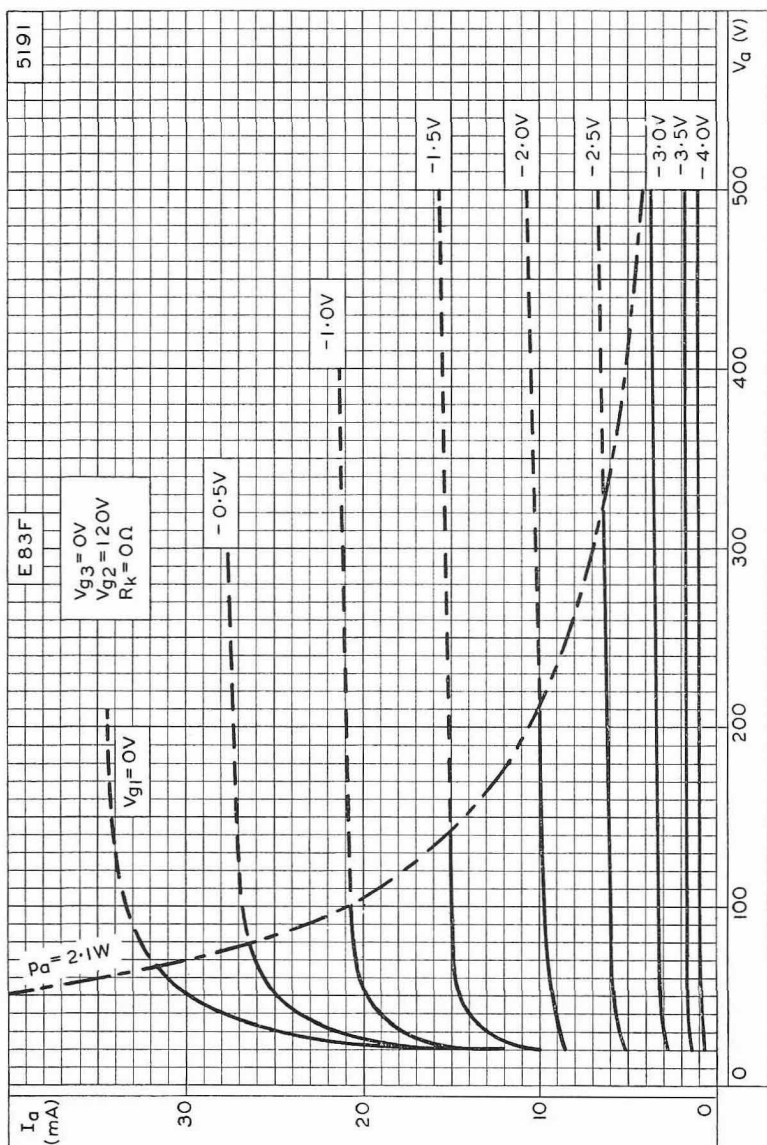
ANODE CURRENT, SCREEN-GRID CURRENT AND MUTUAL CONDUCTANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE AT $V_a = 210V$, $V_{g2} = 120V$.

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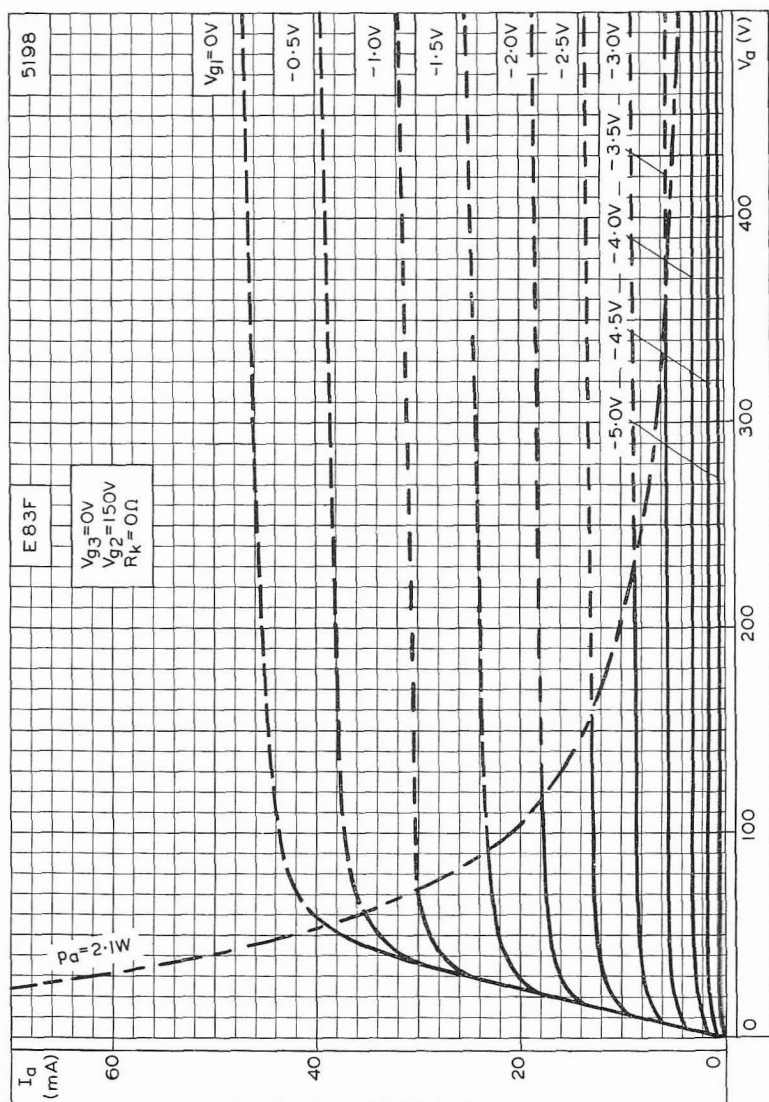
ANODE CURRENT, SCREEN-GRID CURRENT AND MUTUAL CONDUCTANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE AT $V_a = 210V$, $V_{g2} = 150V$.



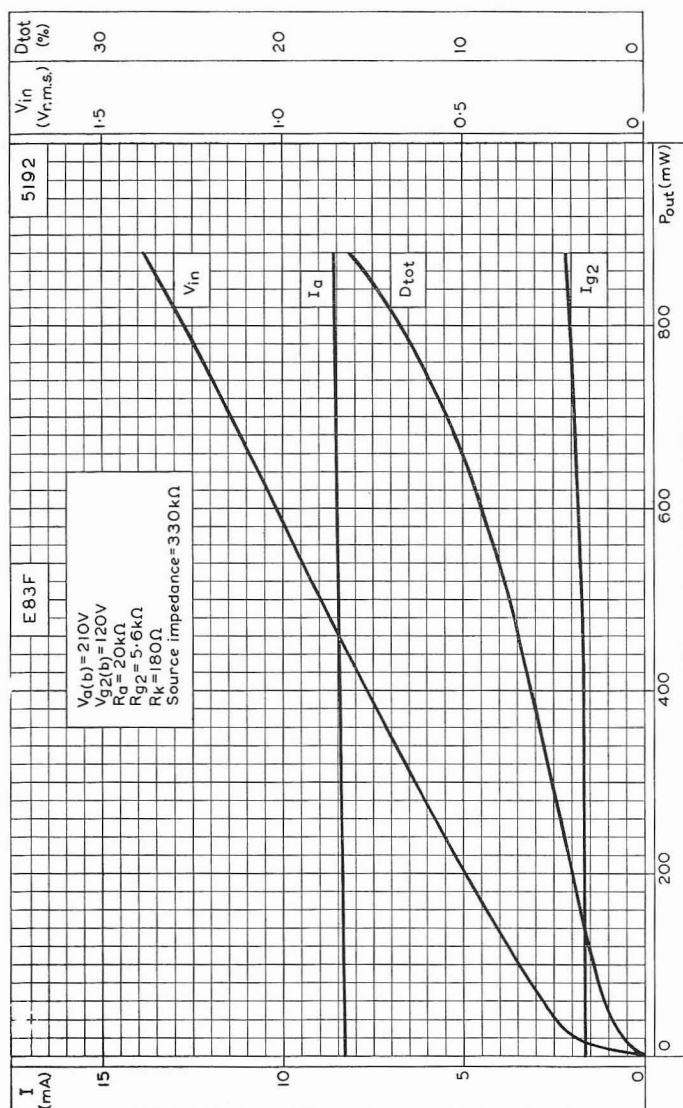
ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER. $V_{g2} = 120V$

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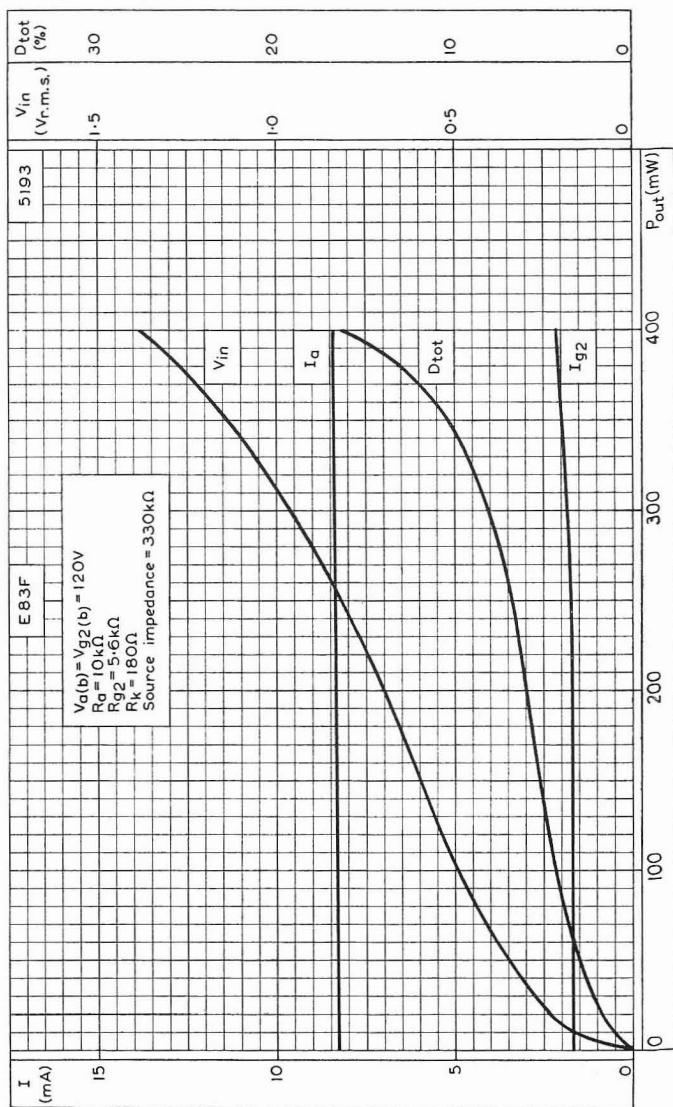
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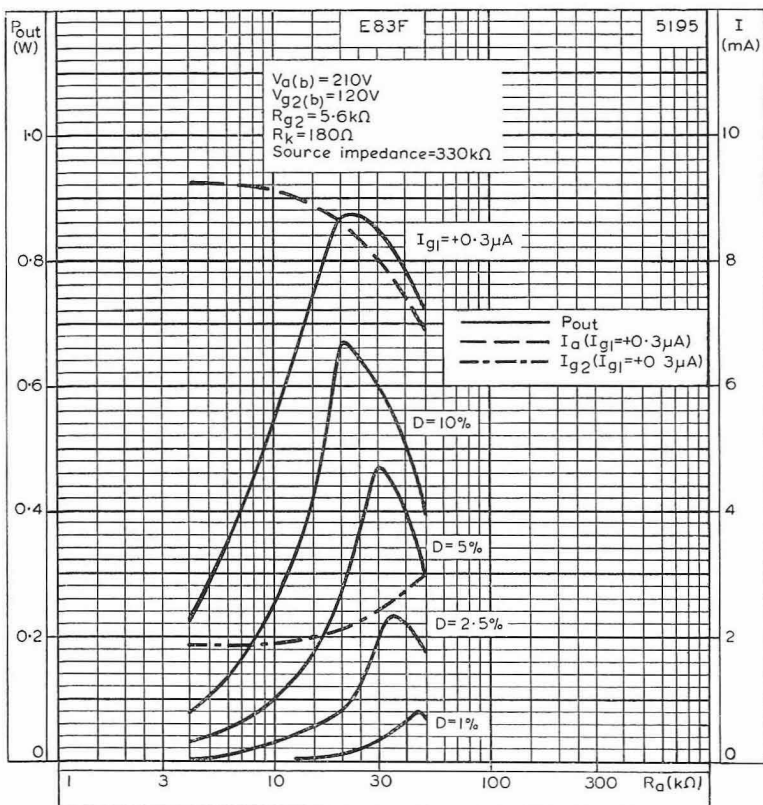
ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-
GRID VOLTAGE AS PARAMETER. $V_{g2}=150V$



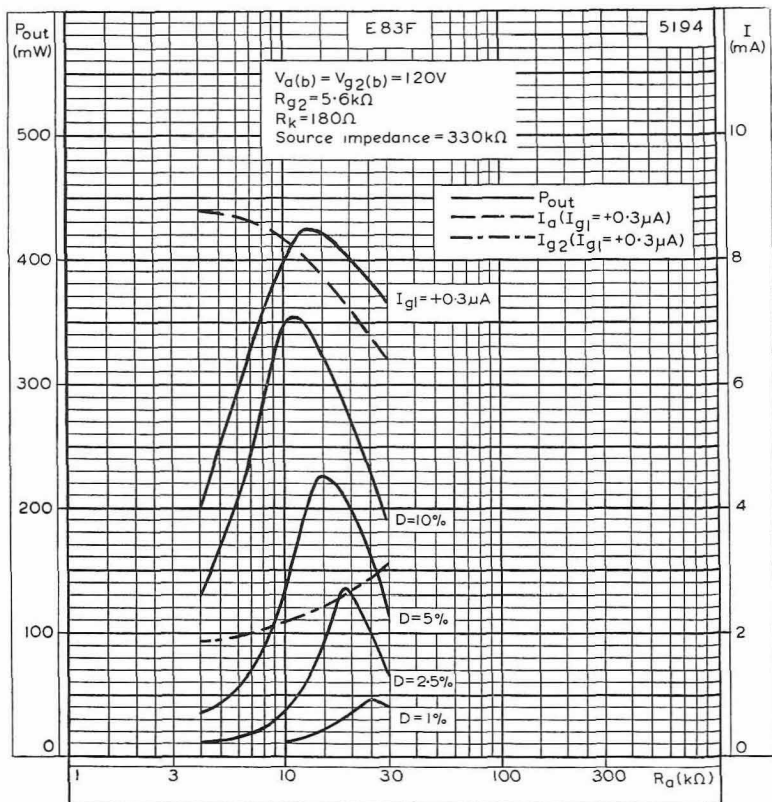
PERFORMANCE OF E83F AS A SINGLE VALVE CLASS "A" AMPLIFIER WITH
 $V_{a(b)} = 210V$, $V_{g2(b)} = 120V$



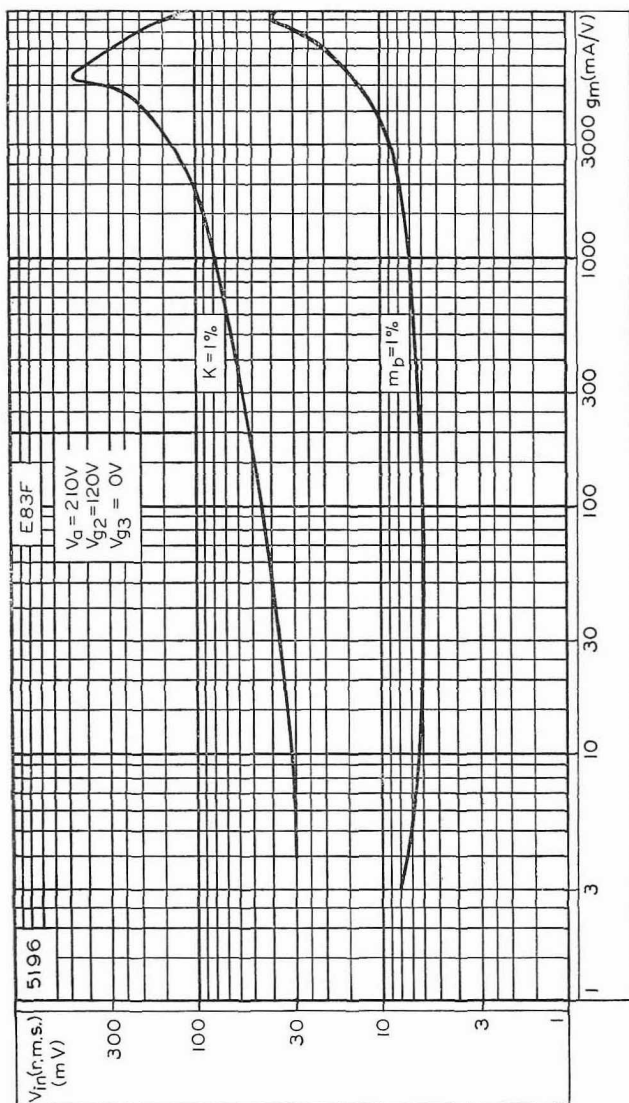
PERFORMANCE OF E83F AS A SINGLE VALVE CLASS "A" AMPLIFIER WITH
 $V_{a(b)} = V_{g2(b)} = 120V$



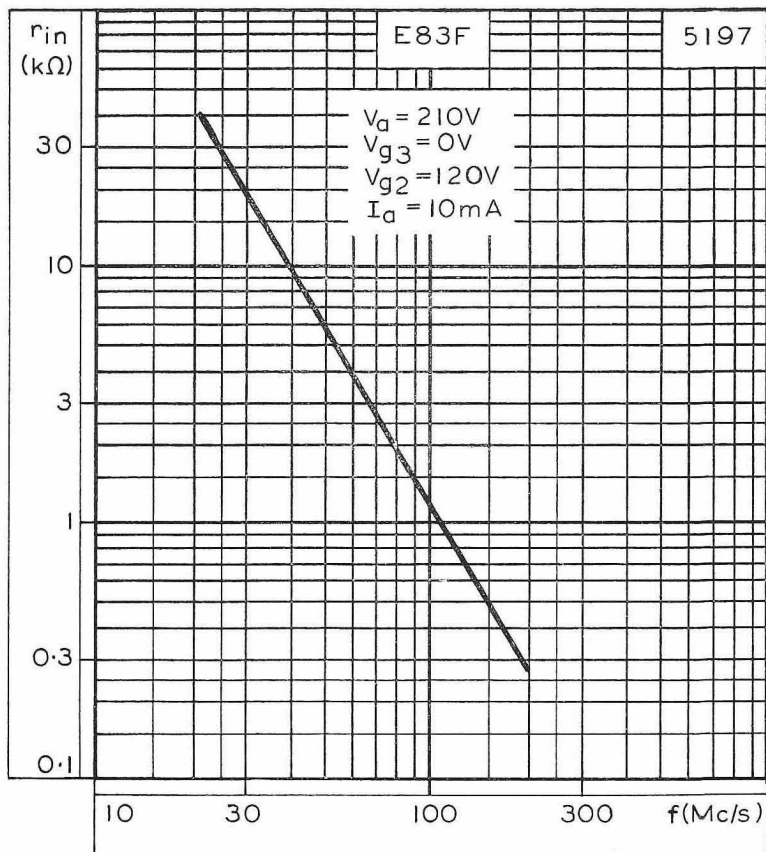
POWER OUTPUT, ANODE CURRENT AND SCREEN-GRID CURRENT
PLOTTED AGAINST ANODE LOAD RESISTANCE AT $V_{a(b)} = 210V$, $V_{g2(b)} = 120V$



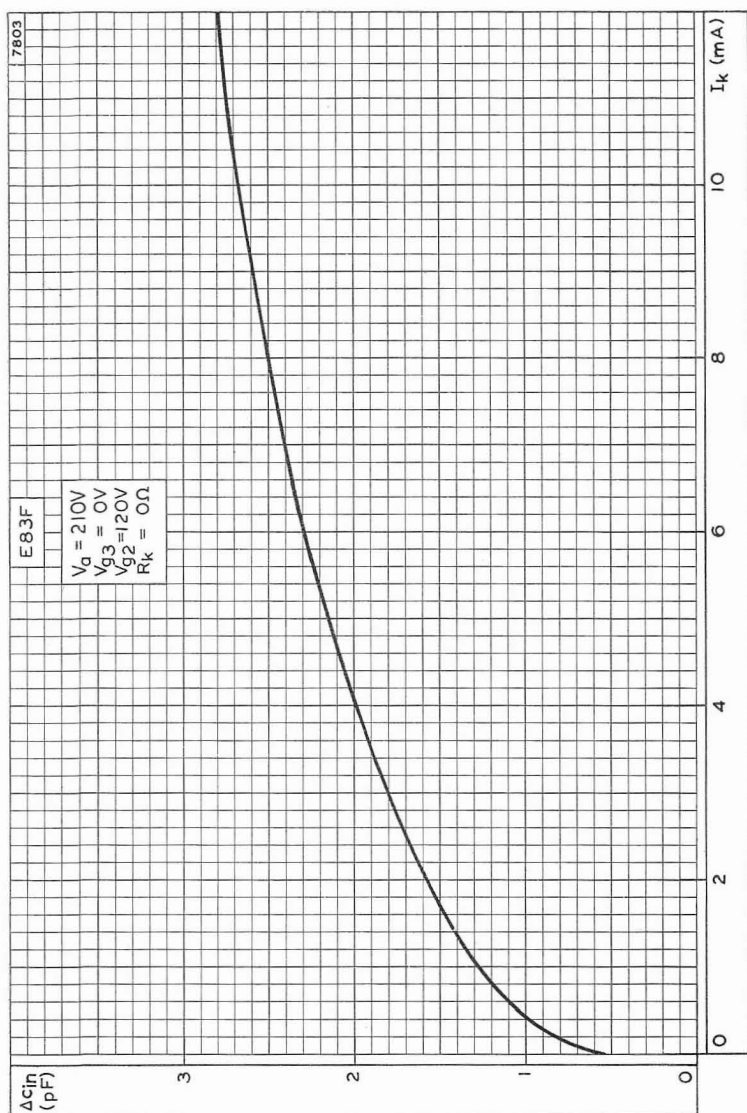
POWER OUTPUT, ANODE CURRENT AND SCREEN-GRID CURRENT
PLOTTED AGAINST ANODE LOAD RESISTANCE AT $V_{a(b)} = V_{g2(b)} = 120V$



CROSS MODULATION AND MODULATION HUM CURVES



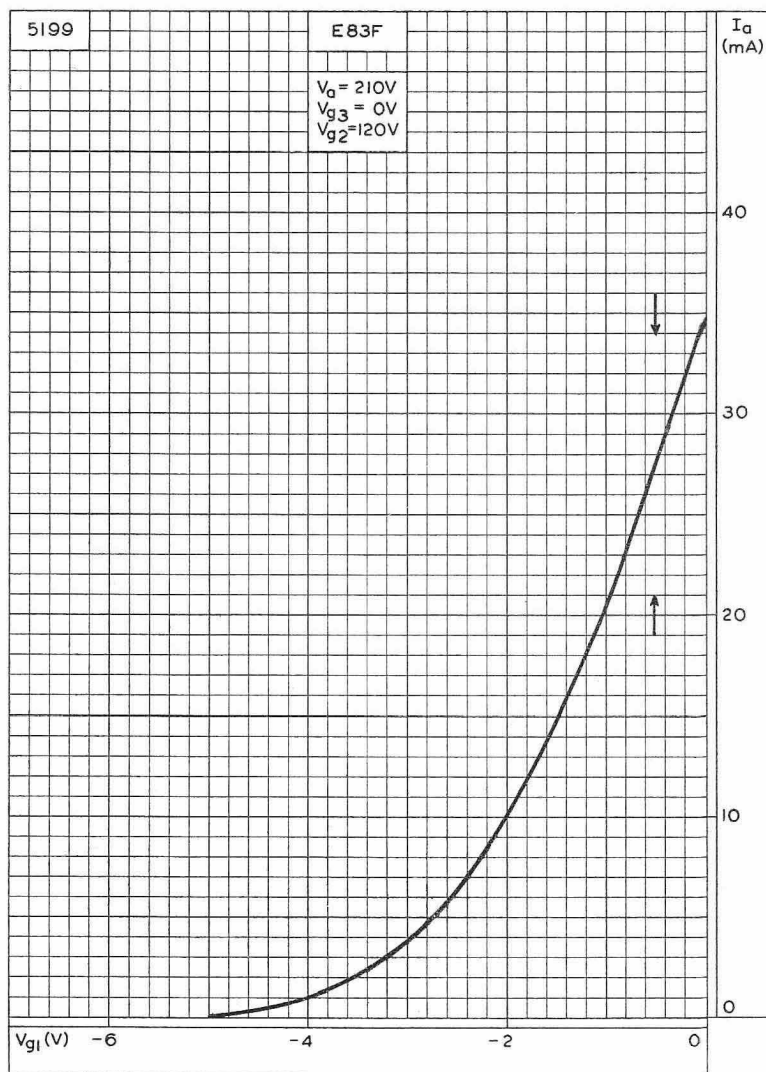
INPUT RESISTANCE PLOTTED AGAINST FREQUENCY AT $V_a = 210V$,
 $V_{g2} = 120V$



INCREMENTAL INPUT CAPACITANCE PLOTTED AGAINST CATHODE
CURRENT AT $V_a = 210V$, $V_{g2} = 120V$

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SPREAD OF ANODE CURRENT PLOTTED AGAINST CONTROL-GRID VOLTAGE AT $V_a = 210V$, $V_{g2} = 120V$