

V.H.F. POWER TRIODE

TY3-250

All-glass triode rated for a maximum anode dissipation of 250W and suitable for use at frequencies up to 150 Mc/s.

This data should be read in conjunction with "Operating Notes, Part I—Power Valves" included in this volume of the Handbook.

FILAMENT	Thoriated tungsten.		
V_f		5.0	V
I_f		14	A

MOUNTING POSITION Vertical, base up or down.

CAPACITANCES

C_{a-f}	0.15	$\mu\mu\text{F}$
C_{g-f}	7.0	$\mu\mu\text{F}$
C_{a-g}	5.3	$\mu\mu\text{F}$

CHARACTERISTICS (Measured at $I_a = 90$ mA)

g_m	5.0	mA/V
μ	25	

COOLING

Maximum temperature of base pins	180	$^{\circ}\text{C}$
Maximum temperature of anode seal	220	$^{\circ}\text{C}$

In order to keep within the temperature limits it may be necessary to direct a flow of air on to the anode seal and the base of the valve when operated at frequencies above 30 Mc/s. The air stream on to the base should be directed so that it also passes over the envelope. Below 30 Mc/s radiation cooling from the envelope is sufficient but an anode terminal connection of large surface area is necessary in order to keep the anode seal cool.

OPERATING CONDITIONS AS SINGLE VALVE R.F. POWER AMPLIFIER (CLASS "C" TELEGRAPHY OR F.M. TELEPHONY)

Limiting Values

V_a max.	3.0	kV
P_a max.	250	W
P_g max.	30	W
I_k max.	480	mA
$i_{k(pk)}$ max.	3.0	A
R_{g-f} max.	100	k Ω

Typical Operating Conditions at $f \leq 100$ Mc/s

V_a	1.5	2.0	2.5	3.0	kV
V_g	-120	-150	-200	-250	V
I_a	400	400	400	365	mA
I_g	80	80	69	69	mA
$V_{in(pk)}$	295	320	380	430	V
P_{drive}	22	23	24	27	W
P_a	175	215	250	250	W
P_{out}	425	585	750	845	W
η	71	73	75	77	%
* P_{load}	340	470	600	670	W

*With a circuit transfer efficiency of 80%

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OPERATING CONDITIONS AS SINGLE VALVE R.F. POWER AMPLIFIER (CLASS "B" TELEPHONY)

Limiting Values

V_a max.	3.0	kV
p_a max.	250	W
p_g max.	30	W
I_k max.	300	mA
$I_{k(pk)}$ max.	1.5	A
R_{g-f} max.	100	k Ω

Typical Operating Conditions at $f \leq 100$ Mc/s

V_a	2.0	2.5	3.0	kV
V_g	-70	-90	-110	V
I_a	188	153	130	mA
$V_{in(pk)}$	86	89	91	V
p_a	250	250	250	W
P_{out}	126	133	140	W
η	33	35	36	%
* P_{load}	100	106	112	W
For 100% Modulation				
I_g	85	70	62	mA
P_{drive}	13.2	11.3	10.2	W

*With a circuit transfer efficiency of 80%

OPERATING CONDITIONS AS SINGLE VALVE R.F. POWER AMPLIFIER (CLASS "C" ANODE MODULATION)

Limiting Values

V_a max.	2.5	kV
p_a max.	250	W
p_g max.	30	W
I_k max.	350	mA
$I_{k(pk)}$ max.	3.0	A
R_{g-f} max.	100	k Ω

Typical Operating Conditions at $f \leq 100$ Mc/s

V_a	2.0	2.5	kV
V_g	-225	-300	V
I_a	250	250	mA
I_g	70	70	mA
$V_{in(pk)}$	370	440	V
P_{drive}	24	28	W
p_a	125	143	W
P_{out}	375	482	W
η	75	77	%
* P_{load}	300	385	W
For 100% Modulation			
P_{mod}	250	312	W

*With a circuit transfer efficiency of 80%

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OPERATING CONDITIONS FOR TWO VALVES AS GROUNDED GRID R.F. POWER AMPLIFIER (CLASS "C" TELEGRAPHY OR F.M. TELEPHONY)

Limiting Values

V_a max.	3.0	kV
p_a max.	250	W
p_g max.	30	W
I_k max.	480	mA
$i_{k(pk)}$ max.	3.0	A
R_{g-f} max.	100	k Ω

Typical Operating Conditions at $f \leq 100$ Mc/s

V_a	1.5	2.0	2.5	3.0	kV
V_g	-120	-150	-200	-250	V
I_a	2×400	2×400	2×400	2×363	mA
I_g	2×80	2×80	2×69	2×69	mA
$V_{in(g-g)}$ pk	590	640	760	860	V
P_{drive}	2×116	2×125	2×147	2×155	W
* P_{out}	$850 + 190$	$1170 + 204$	$1500 + 247$	$1680 + 256$	W
† η	71	73	75	77	%
‡ P_{load}	830	1100	1400	1550	W

*Includes power transferred from driver stage.

†Valve efficiency.

‡With a circuit transfer efficiency of 80%.

OPERATING CONDITIONS FOR TWO VALVES AS A.F. CLASS "B" AMPLIFIER OR MODULATOR

Limiting Values

V_a max.	3.0	kV
p_a max.	250	W
p_g max.	30	W
I_k max.	480	mA
$i_{k(pk)}$ max.	3.0	A
R_{g-f} max.	100	k Ω

Typical Operating Conditions

V_a	1.5	2.0	2.5	3.0	kV
V_g	-47.5	-68.5	-90	-110	V
$I_{a(o)}$	2×50	2×50	2×50	2×50	mA
I_a (max. sig.)	2×390	2×390	2×335	2×280	mA
I_g	2×90	2×90	2×70	2×60	mA
$V_{in(g-g)}$ r.m.s.	2×132	2×150	2×155	2×165	V
R_{a-a}	4.65	6.45	9.65	14.2	k Ω
p_a	2×155	2×180	2×180	2×180	W
P_{out}	860	1200	1300	1340	W
D_{tot}	3.0	3.2	3.6	4.4	%



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INDUSTRIAL RATINGS

Limiting Values (Absolute Ratings)

V_a max.	3.0	kV
p_a max.	250	W
p_g max.	30	W
I_k max.	480	mA
$i_{k(p_k)}$ max.	3.0	A
R_{g-f} max.	100	k Ω

Operating conditions providing reserves against such exigencies as variations of supply voltages, insertion of load material of poor power factor and momentary overload due to circuit flash-over. A reliable overload circuit breaker is necessary to protect the valve in case oscillation ceases for any reason.

Anode Supply	Smoothed d.c.	F.W. rectification unsmoothed	
$V_{\text{transformer (r.m.s.)}}$	—	2700-0-2700	V
V_a	2.7	2.43	kV
I_a	250	225	mA
I_g	85	76	mA
$I_g (I_a = 100 \text{ mA})$	110	90	mA
R_{g-f}	3.5	3.5	k Ω
P_{drive}	33	33	W
p_a	160	160	W
P_{out}	513	513	W
* P_{load}	370	370	W
† P_{load} (with poor load)	310	310	W
† p_a	250	250	W

*With a circuit transfer efficiency of 75%.

†This condition can result from setting up a dielectric heater to treat a normal load of say, phenolic resin and substituting a similar weight of a different powder of different electrical characteristics.

Operating conditions for a valve fully protected against every contingency.

Anode Supply	Smoothed d.c.	F.W. Rectification unsmoothed	
$V_{\text{transformer (r.m.s.)}}$	—	3000-0-3000	V
V_a	3.0	2.7	kV
I_a	363	327	mA
I_g	70	63	mA
R_{g-f}	3.5	3.5	k Ω
P_{drive}	27	27	W
p_a	250	250	W
P_{out}	840	840	W
* P_{load}	630	630	W

*With a circuit transfer efficiency of 75%.



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WEIGHT

Valve only

{ 6 ozs
170 g

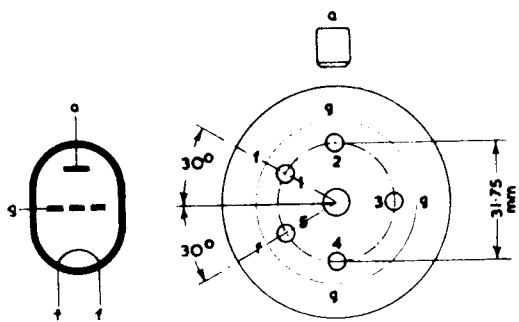
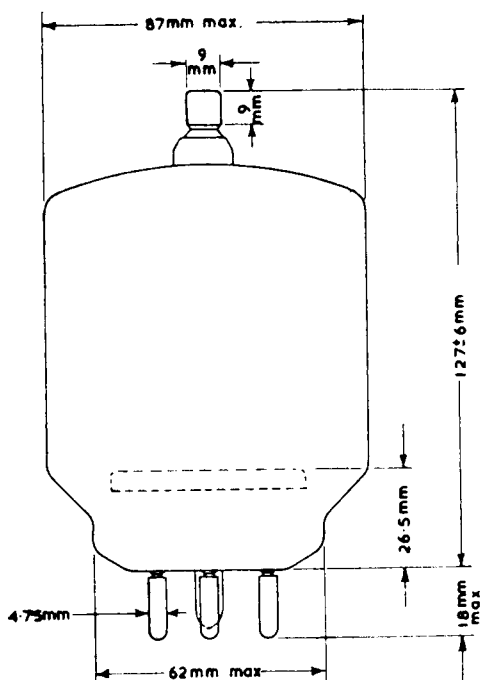
CIRCUIT NOTES

1. The R F. circuit returns must be brought to the filament connection on Pin No. 1.
2. To ensure equal distribution of the currents through the seal the grid leads should be strapped together at the valve holder and the circuit connections joined to the midpoint of the strap. This should not be allowed to impair the free flotation of individual contacts.

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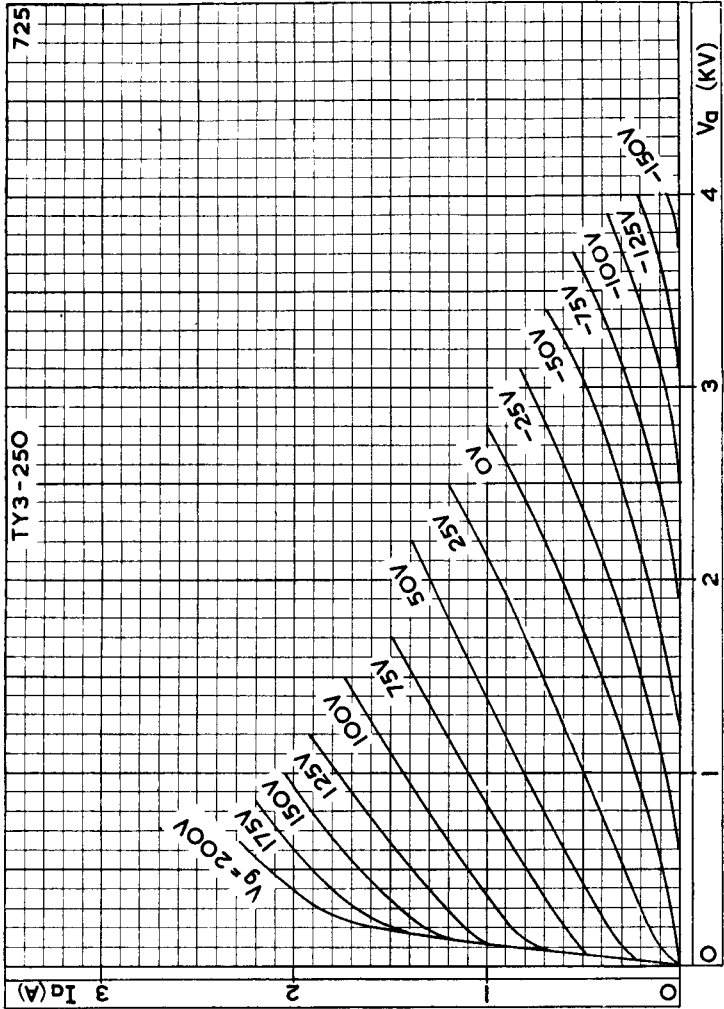
B5F Base.

1661

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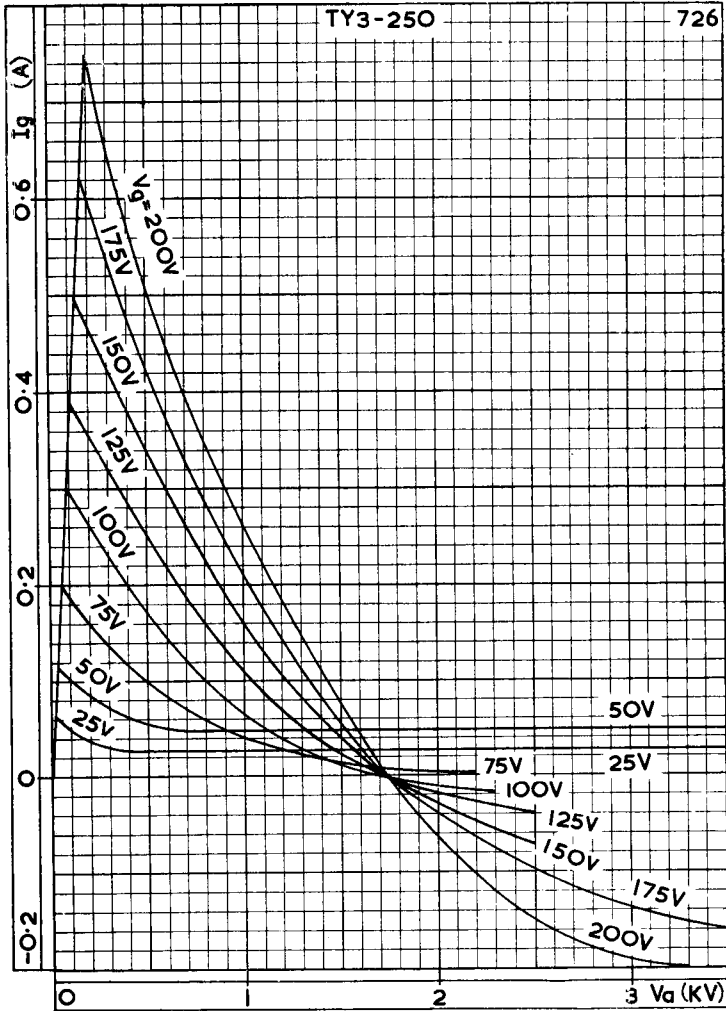


ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE

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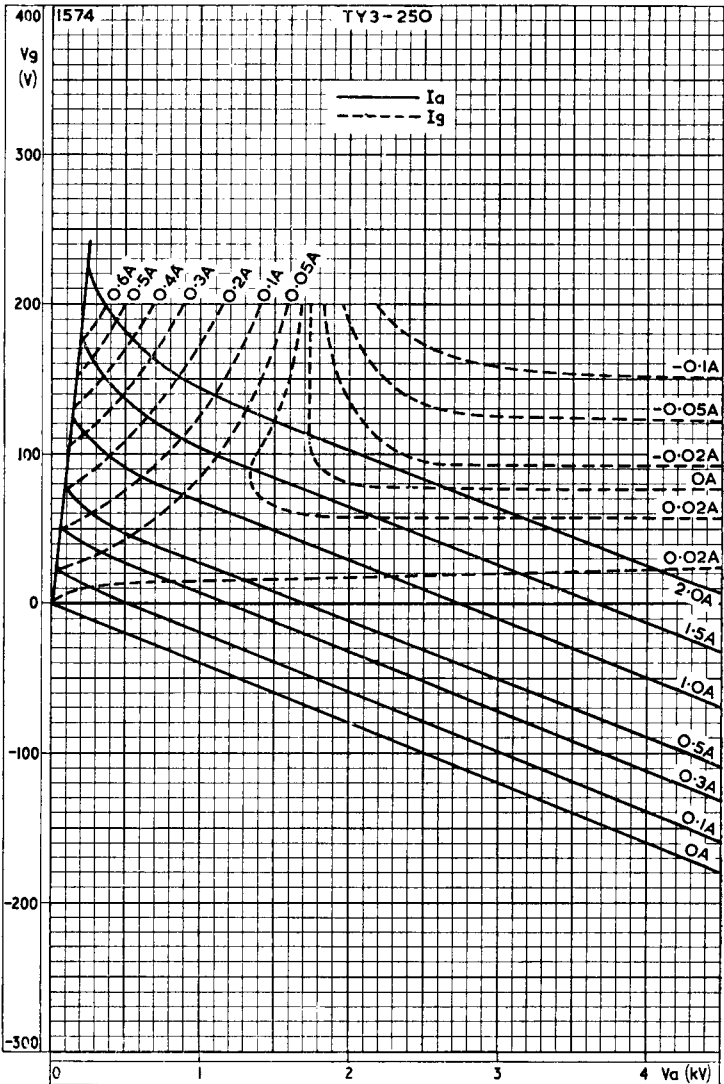


GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE

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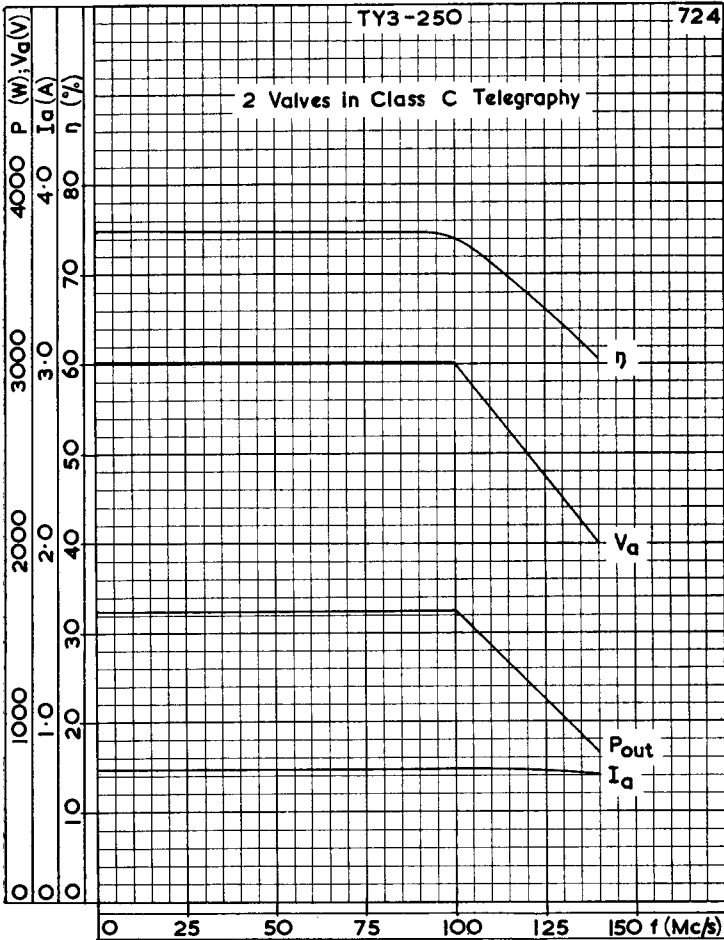


CONSTANT CURRENT CURVES

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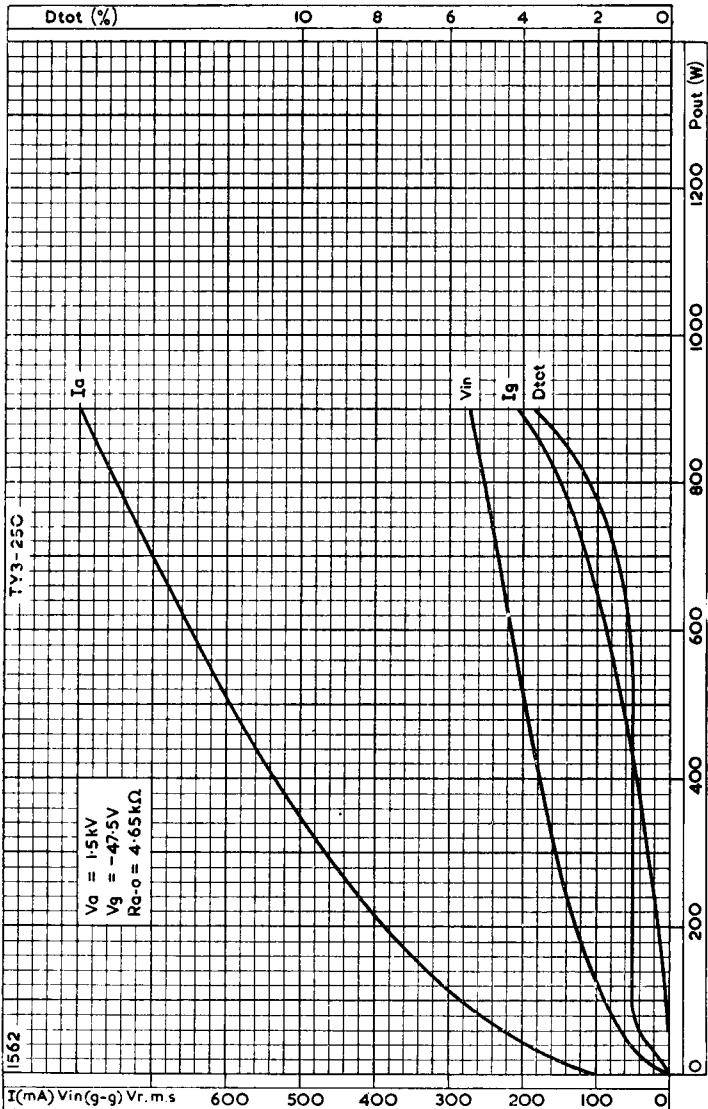
FREQUENCY CHARACTERISTICS



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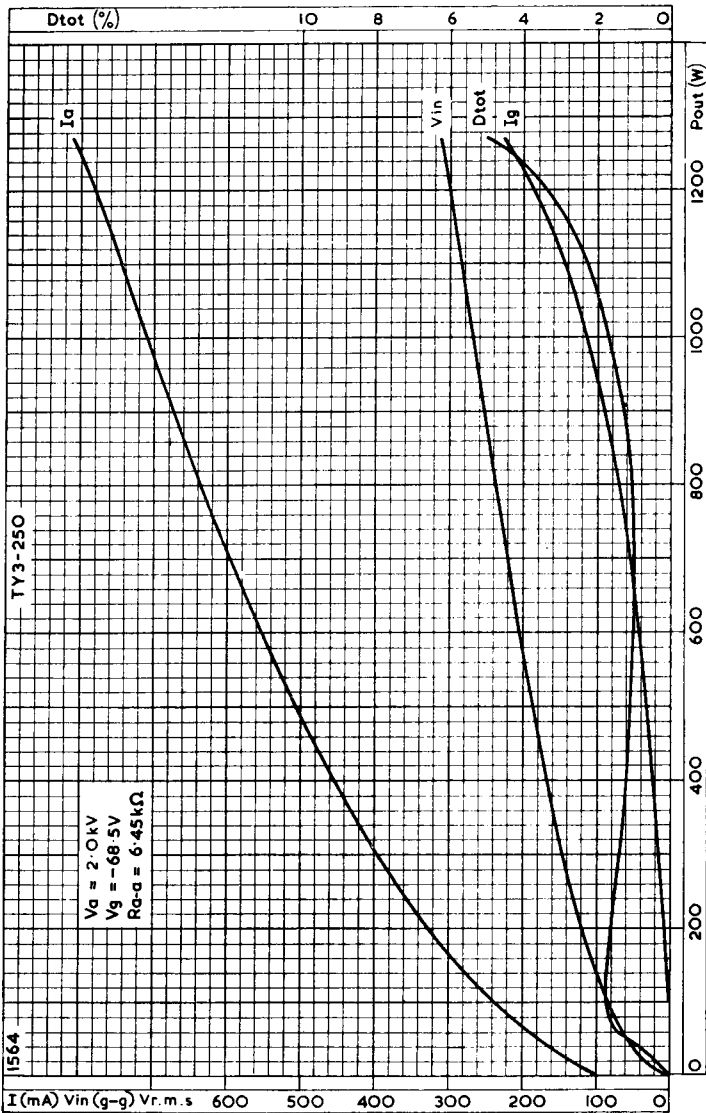


TWO VALVES AS CLASS "B" A.F. AMPLIFIER. $V_a = 1.5 \text{ kV}$

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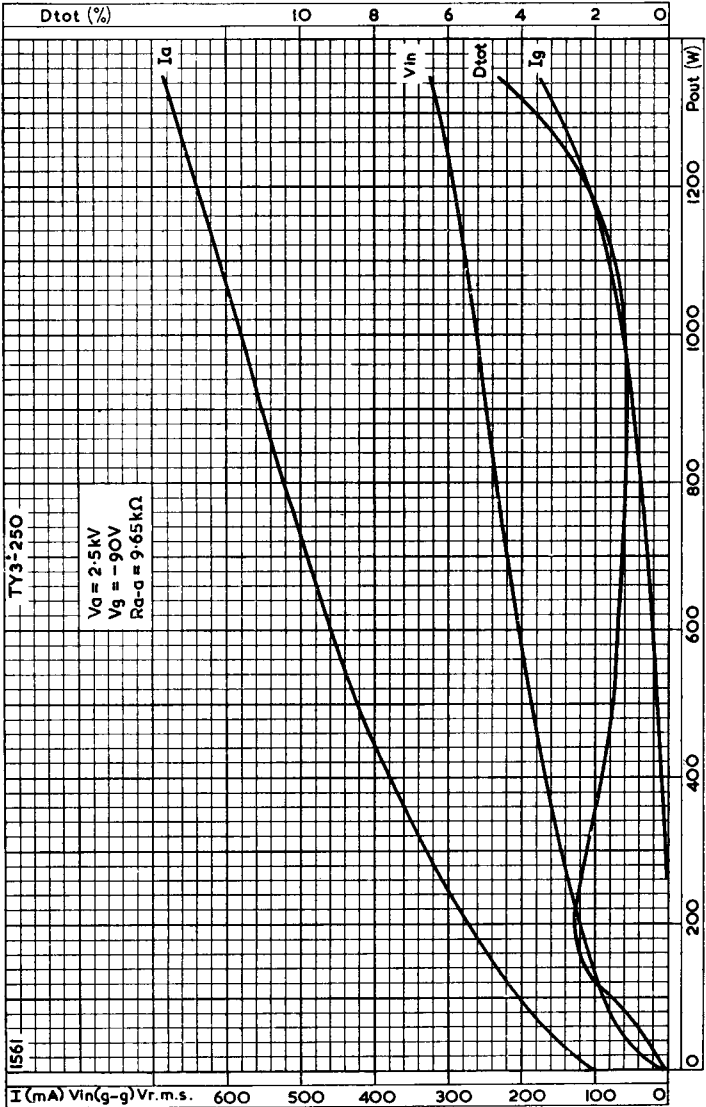


TWO VALVES AS CLASS "B" A.F. AMPLIFIER. $V_a = 2.0 kV$

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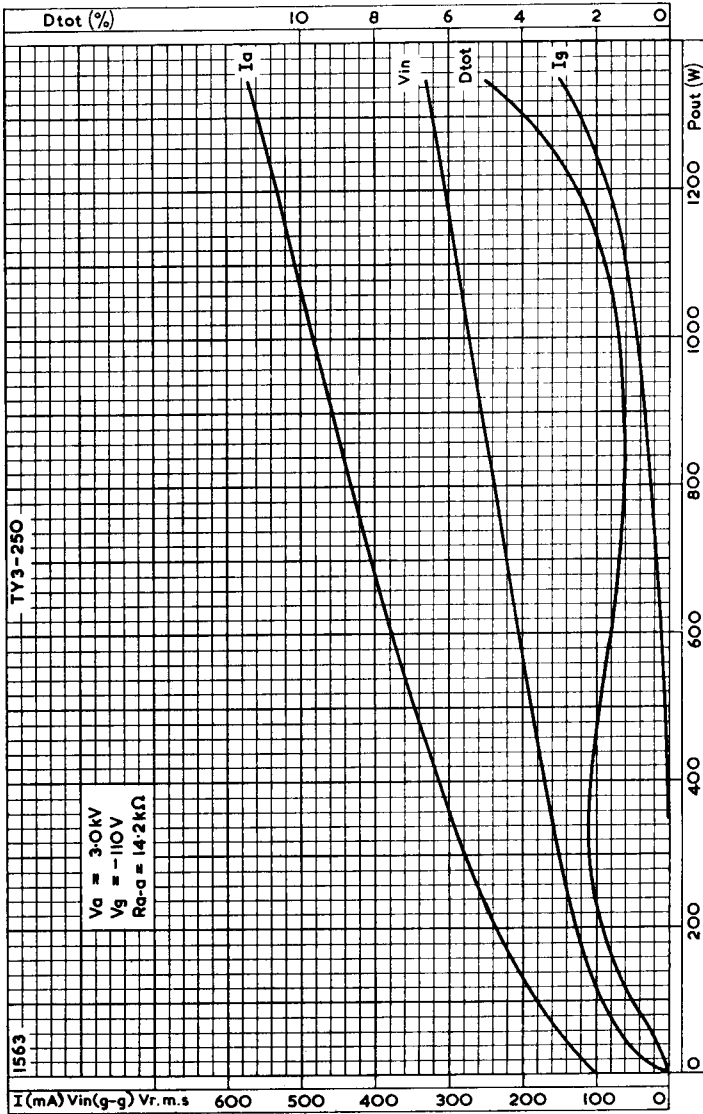
TWO VALVES AS CLASS "B" A.F. AMPLIFIER. $V_a = 2.5 kV$



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TWO VALVES AS CLASS "B" A.F. AMPLIFIER. $V_a = 3.0 \text{ kV}$