

U.H.F. POWER DOUBLE TETRODE

QQV07-50

QUICK REFERENCE DATA

Double tetrode intended for use as u.h.f. power amplifier or frequency multiplier.

	Frequency Multiplier	Class 'C' Telephony Anode and Screen Grid Modulation	Class 'C' Telegraphy or F.M. Telephony	
f	180/60	60	200	Mc/s
P_{out}	27	80	103	W
$f_{max.}$	500	500	500	Mc/s
$V_a_{max.}$ ($f < 250\text{Mc/s}$)	750	600	750	V
($f = 500\text{Mc/s}$)	600	480	600	V
$p_a_{max.}$	2 x 25	2 x 16.7	2 x 25	W

To be read in conjunction with

GENERAL OPERATIONAL RECOMMENDATIONS - TRANSMITTING VALVES

CLASS 'C' TELEGRAPHY OR F.M. TELEPHONY

Maximum operating conditions

f	180	180	470	470	Mc/s
P_{out}	64	103	52	69	W
P_{load}	54	87	44	59	W
η_a	70	75	57	60	%
V_a	400	600	400	500	V
I_a	2 x 115	2 x 115	2 x 115	2 x 115	mA
V_{g2}	250	250	250	250	V
I_{g2}	2 x 7.0	2 x 8.0	2 x 5.0	2 x 4.0	mA
$-V_{g1}$	60	80	50	60	V
I_{g1}	2 x 3.0	2 x 4.0	2 x 3.0	2 x 3.0	mA
$P_{load} \text{ (driver)}$	4.0	4.0	12	14	W
p_a	2 x 14	2 x 17.5	2 x 20	2 x 23	W

CLASS 'C' TELEPHONY ANODE AND SCREEN-GRID MODULATION

Maximum operating conditions (Carrier conditions for 100% modulation)

f	60	180	180	470	Mc/s
P_{out}	80	47	61	37	W
P_{load}	68	40	52	26	W
η_a	78	69	72	55	%
V_a	600	400	500	400	V
I_a	2 x 85	2 x 85	2 x 85	2 x 85	mA
V_{g2}	250	250	250	250	V
I_{g2}	2 x 10	2 x 9.0	2 x 10	2 x 8.0	mA
$-V_{g1}$	90	70	90	70	V
I_{g1}	2 x 4.0	2 x 3.0	2 x 4.0	2 x 2.0	mA
$P_{load} (driver)$					W
p_a	2 x 11	2 x 10.5	2 x 12	2 x 15.5	W

For 100% modulation

P_{mod}	60	36	45	35	W
$v_{g2} (pk)$	185	185	185	185	V

FREQUENCY MULTIPLIER

Maximum operating conditions

f_{out}/f_{in}	180/60	180/60	475/153	Mc/s
P_{out}	19	27	20	W
P_{load}	16	22	16	W
η_a	30	35	28	%
V_a	400	600	450	V
I_a	2 x 80	2 x 64	2 x 78	mA
V_{g2}	250	250	250	V
I_{g2}	2 x 8.0	2 x 4.0	2 x 9.0	mA
$-V_{g1}$	150	175	150	V
I_{g1}	2 x 3.0	2 x 3.0	2 x 3.0	mA
$P_{load} (driver)$				W
p_a	2 x 22.5	2 x 25	2 x 25	W

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ABSOLUTE MAXIMUM RATINGS

	Frequency Multiplier	Class 'C' Telephony	Class 'C' Telegraphy	
V_a max. ($f < 250\text{Mc/s}$)	750	600	750	V
($f = 500\text{Mc/s}$)	600	480	600	V
V_{g2} max.	300	300	300	V
$-V_{g1}$ max.	175	175	175	V
I_k max.	2 x 130	2 x 130	2 x 150	mA
p_a max.	2 x 25	2 x 16.7	2 x 25	W
p_{g2} max.	2 x 3.5	2 x 2.3	2 x 3.5	W
I_{g1} max.	2 x 5.0	2 x 5.0	2 x 5.0	mA
p_{g1} max.	2 x 1.0	2 x 1.0	2 x 1.0	W
R_{g1-k} max. per section (fixed bias)	50	50	50	k Ω
R_{g1-k} max. per section (automatic bias)	100	100	100	k Ω
V_{h-k} max.	100	100	100	V
$V_{g2(b)}$ max.	600	600	600	V

CATHODE

Indirectly heated. The heater is centre-tapped and the two sections may be operated in series or parallel.

	Series	Parallel	
V_h	12.6	6.3	V
I_h	0.9	1.8	A

CAPACITANCES

* c_{a-g1} (each section)	60	mpF
c_{g1-all} (each section)	10.5	pF
c_{a-all} (each section)	3.2	pF
c_{out} (two sections in push-pull)	2.1	pF
c_{in} (two sections in push-pull)	6.7	pF

* Internally neutralised for push-pull operation.



CHARACTERISTICS (each section) measured at $I_a = 30\text{mA}$

ξ_m	4.5	mA/V
μ_{g1-g2}	8.0	

MOUNTING POSITION Any

COOLING

Radiation and convection cooled

Maximum temperatures

Pins	180	$^{\circ}\text{C}$
Seals	250	$^{\circ}\text{C}$
Bulb	250	$^{\circ}\text{C}$

Anode connectors providing a high degree of heat transfer by radiation or by conduction should be used.

Natural cooling is sufficient with:-

$V_a = 750\text{V}$ at frequencies up to 100 Mc/s

$V_a = 600\text{V}$ at frequencies up to 150 Mc/s

$V_a = 300\text{V}$ at frequencies up to 450 Mc/s

Above these limits or with high ambient temperatures it may be necessary to direct a flow of air (up to $5\text{ft}^3/\text{min}$, $0.15\text{m}^3/\text{min}$) on the top of the bulb to keep the seal temperature within the stated limit.

PHYSICAL DATA

	oz	g
Weight of valve	2.0	57

DIMENSIONS

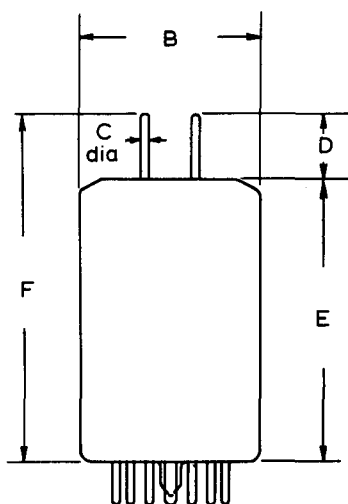
	Inches	Millimetres
B	1.732 ± 0.079	44 ± 2
C	0.079 ± 0.001	2.0 ± 0.1
D	0.650 ± 0.059	16.5 ± 1.5
E	2.874 ± 0.059	73 ± 1.5
F	3.524 ± 0.118	89.5 ± 3.0
G	0.098 ± 0.001	2.5 ± 0.03
H	0.551 ± 0.001	14 ± 0.03

Inch dimensions are derived from original millimetre dimensions.

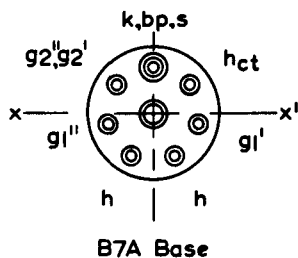
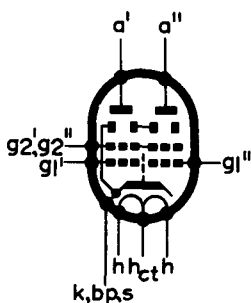
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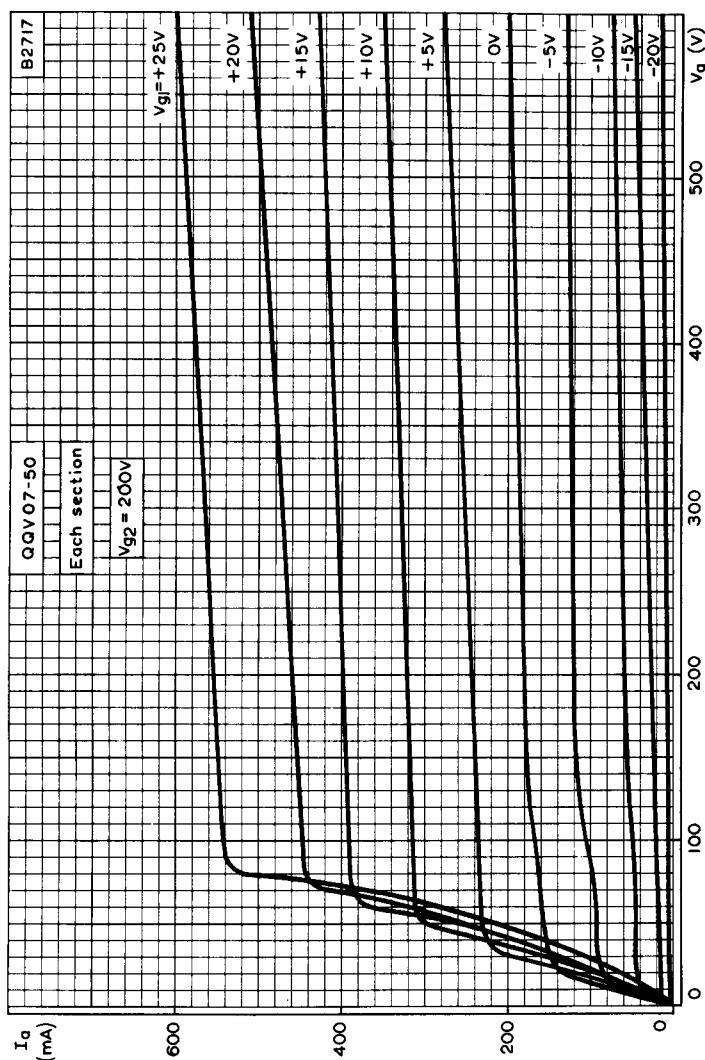


Location of
anode pins
within circles
of dia G.

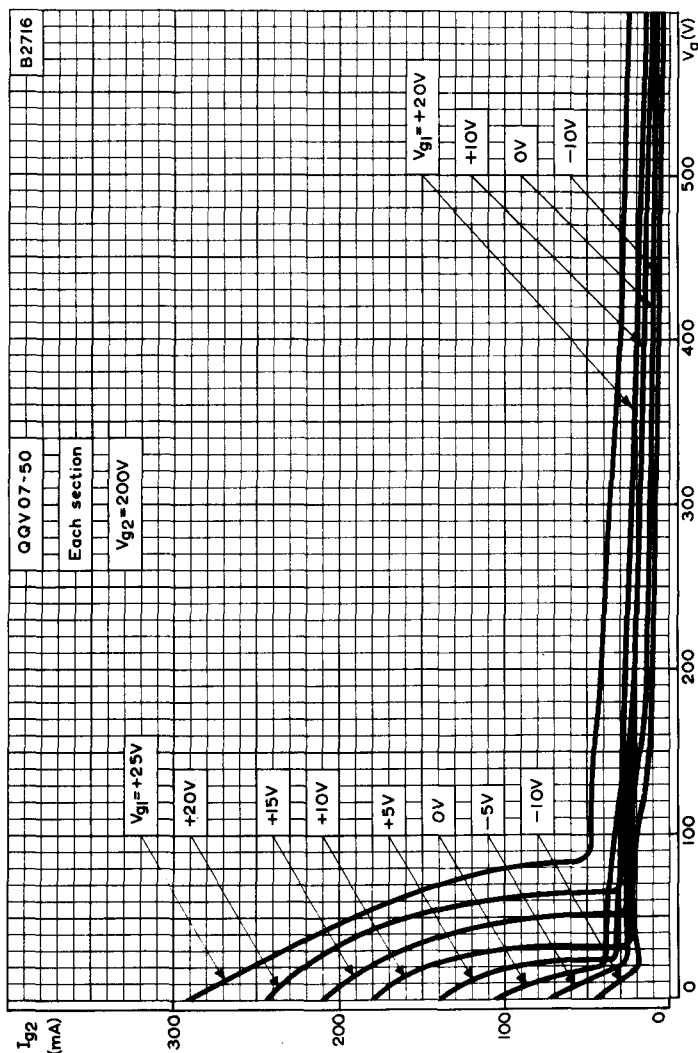


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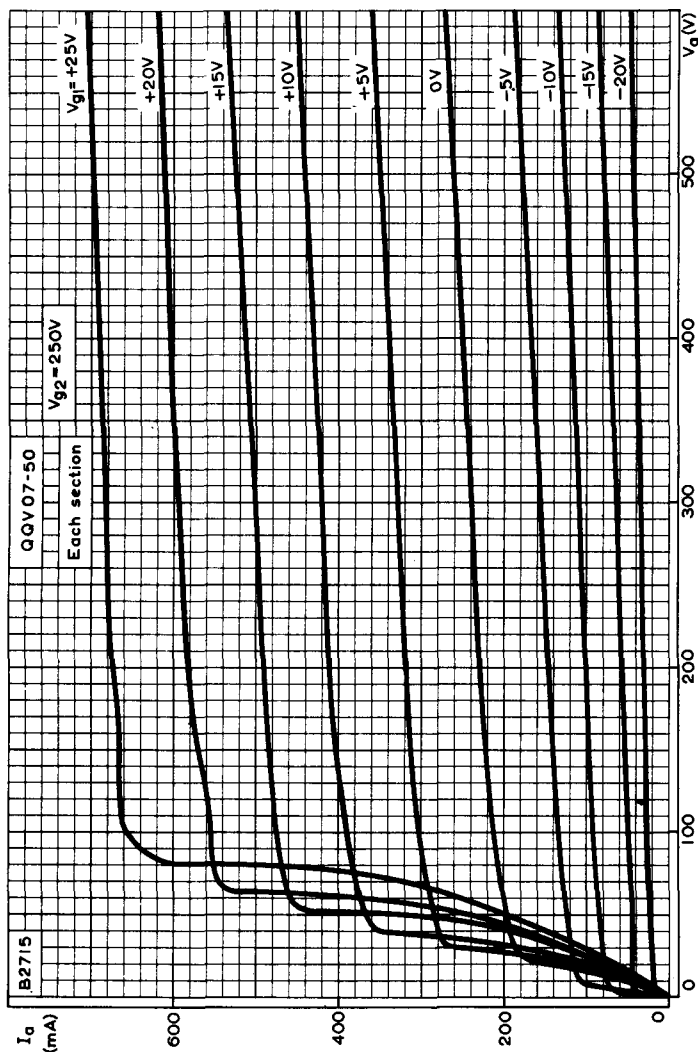
ANODE CURRENT FOR EACH SECTION PLOTTED AGAINST ANODE VOLTAGE
WITH CONTROL-GRID VOLTAGE AS PARAMETER $V_{g2} = 200V$



SCREEN-GRID CURRENT FOR EACH SECTION PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER $V_{g2} = 200V$

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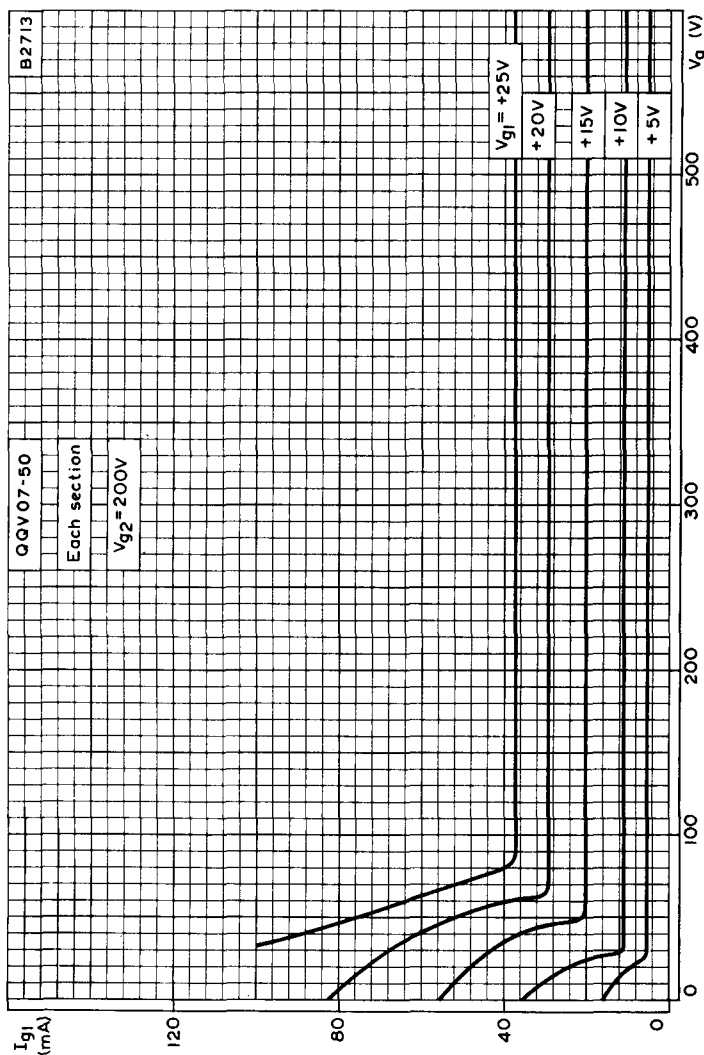
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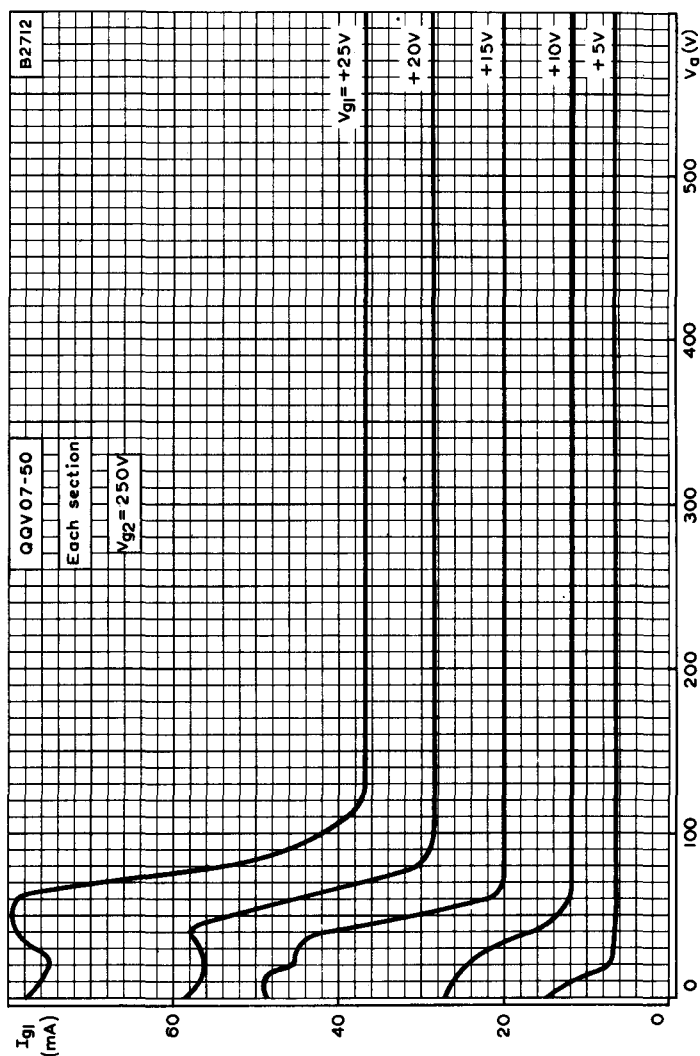
ANODE CURRENT FOR EACH SECTION PLOTTED AGAINST ANODE VOLTAGE
WITH CONTROL-GRID VOLTAGE AS PARAMETER $V_{g2} = 250V$

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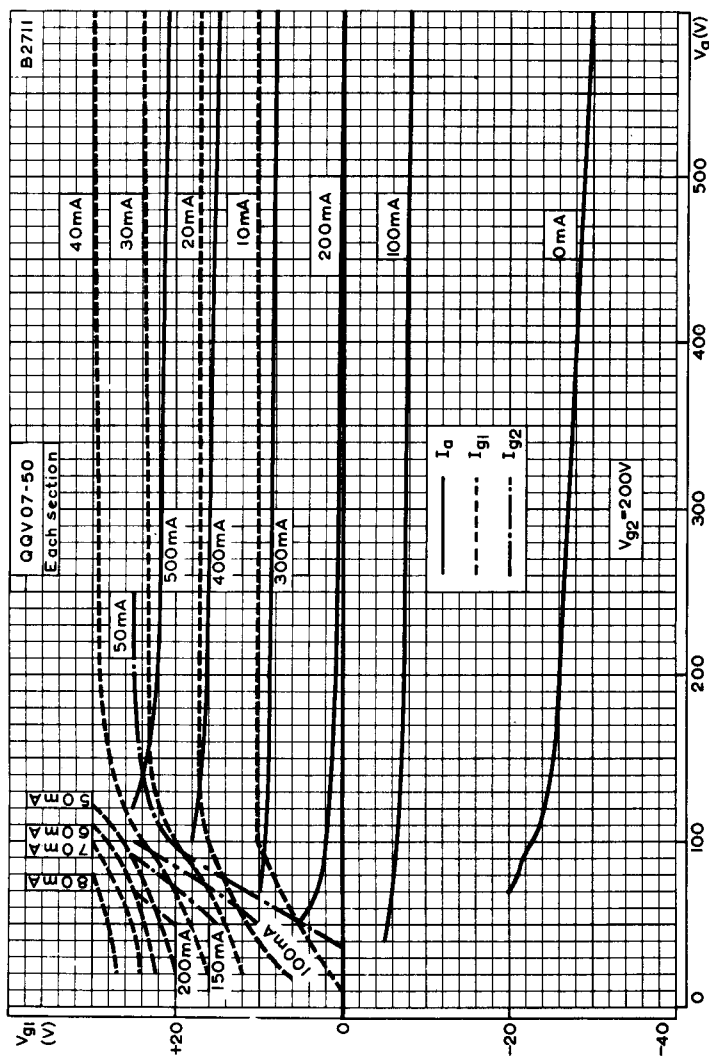
CONTROL-GRID CURRENT FOR EACH SECTION PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER $V_{g2} = 200V$



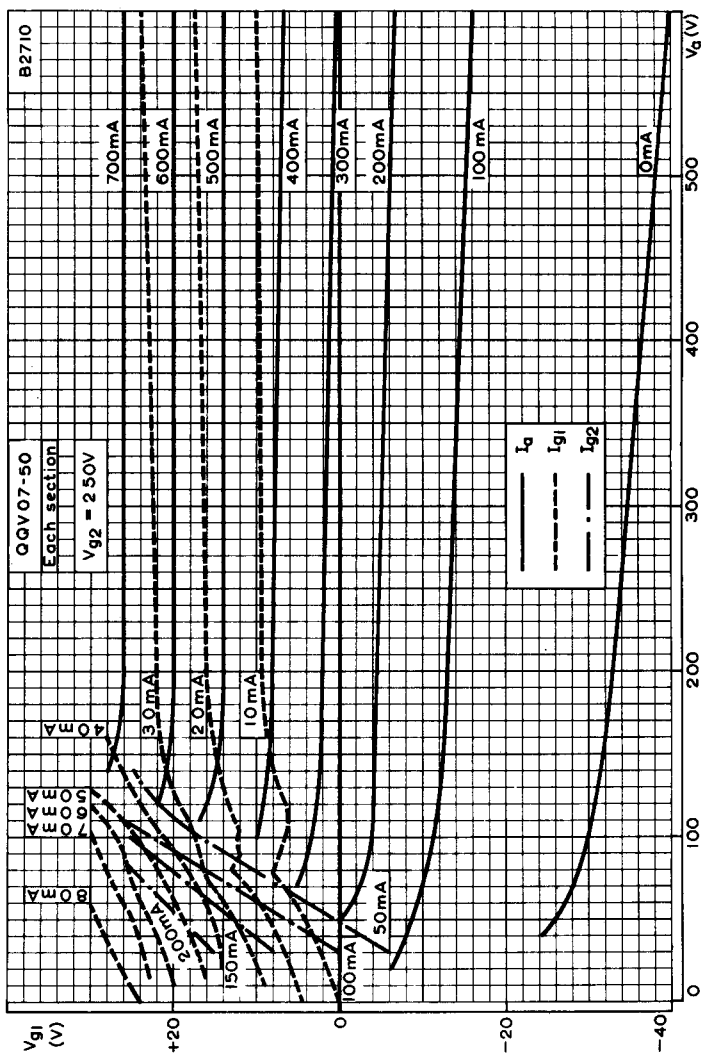
CONTROL-GRID CURRENT FOR EACH SECTION PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER $V_{g2}=250V$

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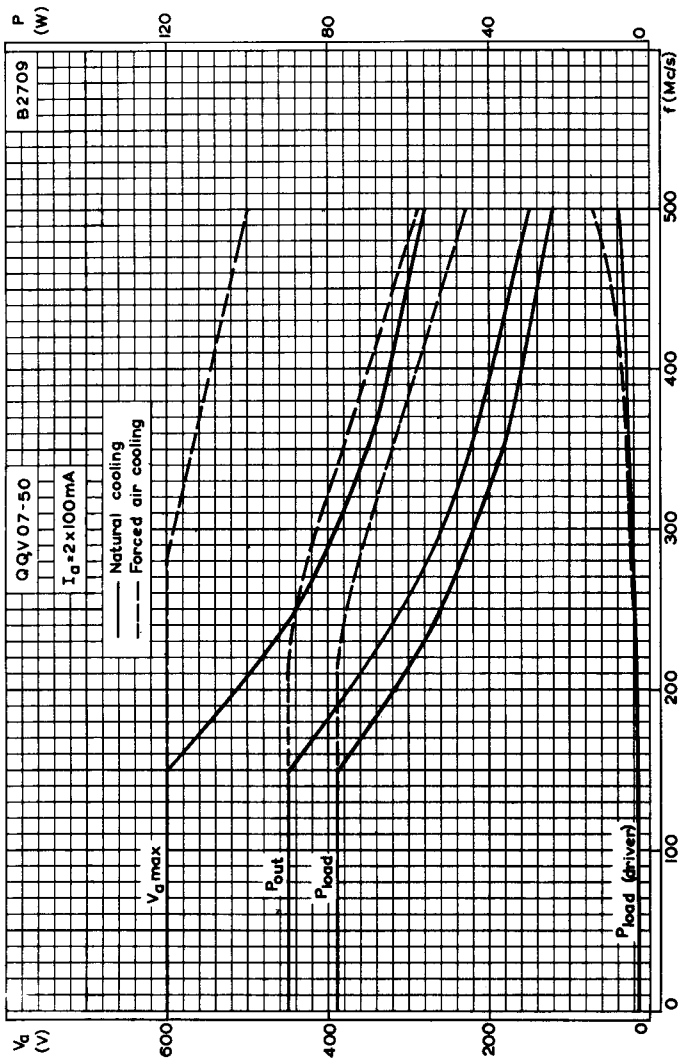
CONSTANT CURRENT CHARACTERISTICS FOR EACH SECTION $V_{g2}=200V$



CONSTANT CURRENT CHARACTERISTICS FOR EACH SECTION $V_{g2} = 250V$

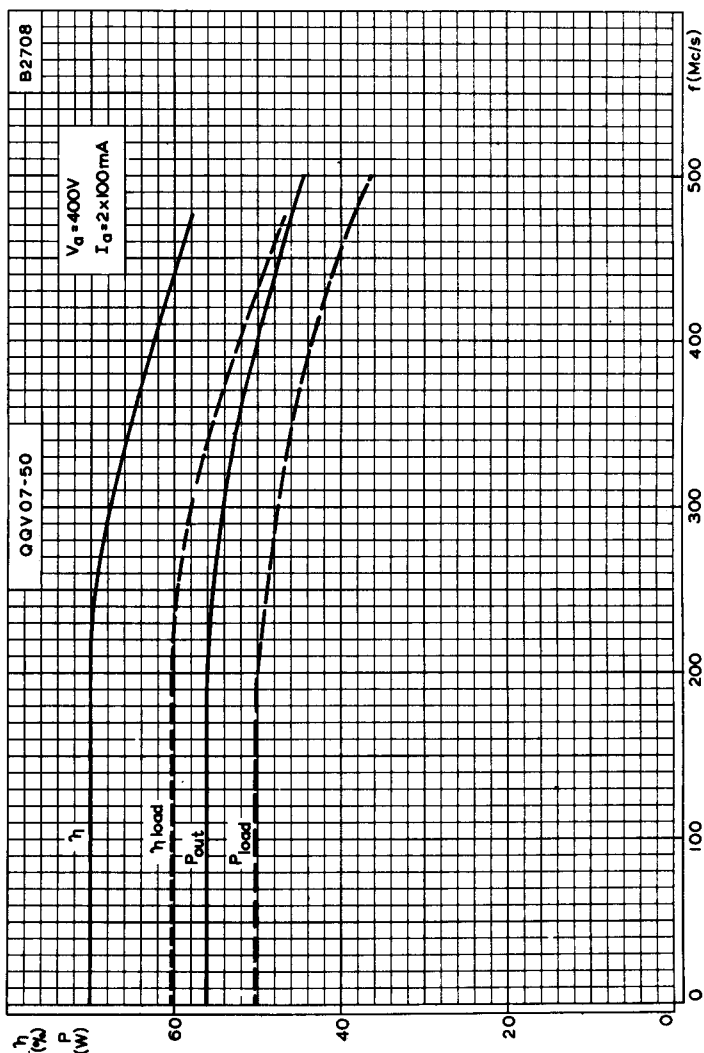
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MAXIMUM OPERATING CONDITIONS FOR A PUSH-PULL R.F. POWER AMPLIFIER (CLASS 'C' TELEGRAPHY OR F.M. TELEPHONY)

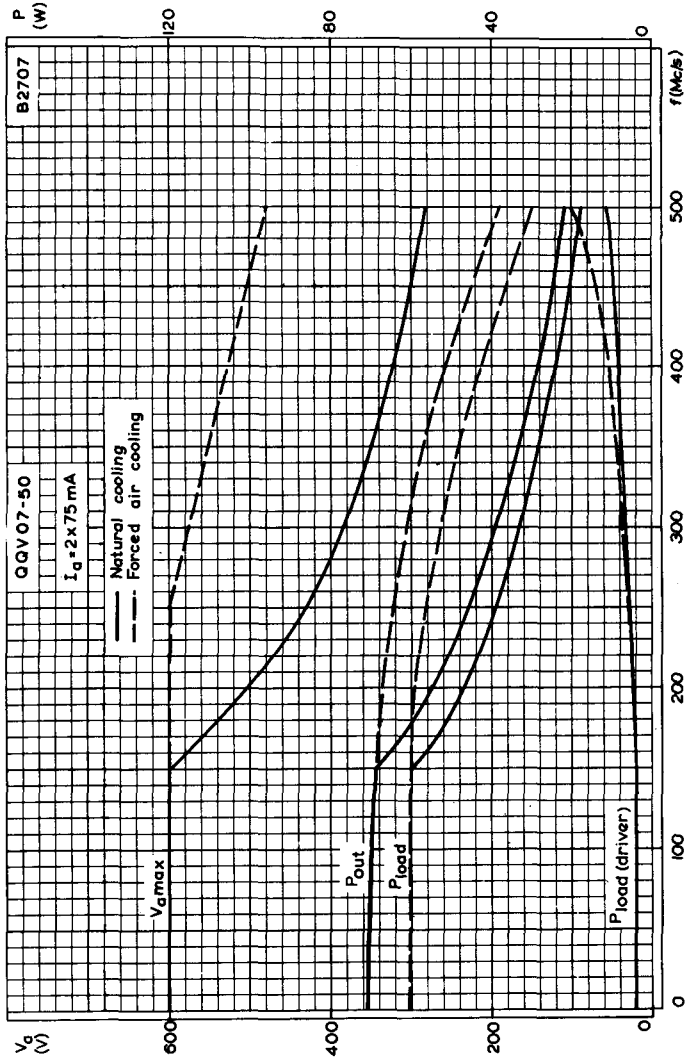




FREQUENCY CHARACTERISTICS FOR OPERATING CONDITIONS AS A PUSH-PULL R.F. POWER AMPLIFIER (CLASS 'C' TELEGRAPHY OR F.M. TELEPHONY)

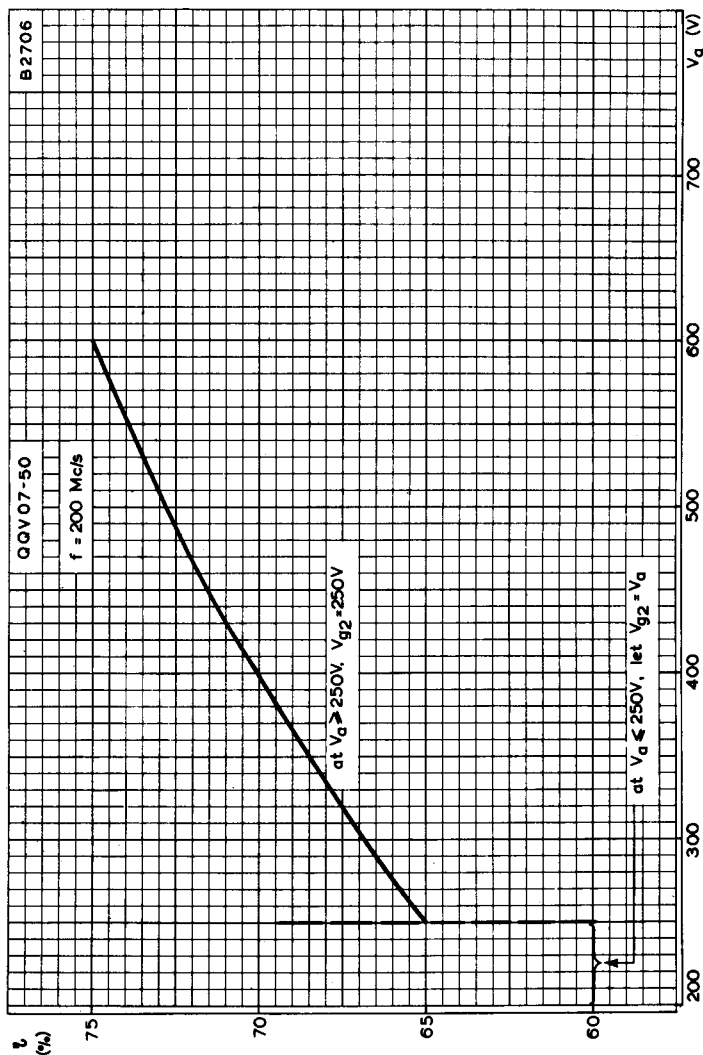
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MAXIMUM OPERATING CONDITIONS FOR AN ANODE AND SCREEN-GRID
MODULATED R.F. POWER AMPLIFIER (CLASS 'C' TELEPHONY)





ANODE EFFICIENCY PLOTTED AGAINST ANODE VOLTAGE FOR CLASS 'C'
PUSH-PULL TELEGRAPHY