R.F. BEAM POWER TETRODES

QUICK REFERENCE DATA

freq.	class-C telegraphy V_a	class-C telegraphy W_o	class-C ag_2 modulator V_a	class-C ag_2 modulator W_o	class-B single side band V_a	class-B single side band W_o**	class-B modulator* V_a	class-B modulator* W_o
MHz	V	W	V	W	V	W	V	W
30	750	200	600	130	750	220	750 600	300 200

HEATING: indirect, cathode oxide-coated

			QE08/200	QE08/200H	
Heater voltage	V_f	=	6,3	26,5	V
Heater current	I_f	=	3,9	0,85	A

COOLING: radiation and convection

CAPACITANCES

Anode to all other elements except grid 1	C_a	=	12,7	pF
Grid 1 to all other elements except anode	C_{g1}	=	30	pF
Anode to grid 1	C_{ag1}	<	0,9	pF

TYPICAL CHARACTERISTICS

Anode voltage	V_a	=	750	V
Grid 2 voltage	V_{g2}	=	250	V
Anode current	I_a	=	100	mA
Mutual conductance	S	=	9	mA/V
Amplification factor of grid 2 with respect to grid 1	μ_{g1g2}	=	5,7	

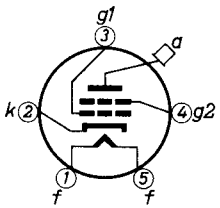
* Two tubes.
** Peak envelope power with double tone signal.

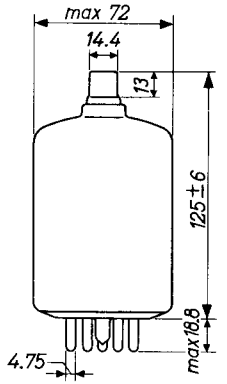
TEMPERATURE LIMITS (Absolute limits)

Anode seal temperature	max.	220 °C
Pin temperature	max.	180 °C
Bulb temperature	max.	300 °C

MECHANICAL DATA

Base : giant 5p
Socket : 2422 512 01001
Top cap : IEC 67-III-1b, type 3
Anode connector : 40619
Net mass : 220 g





Mounting position: vertical, or horizontal with plane of anodes vertical.

R.F. CLASS-C TELEGRAPHY

LIMITING VALUES (Absolute maximum rating system)

Frequency	f		up to	30	MHz
Anode voltage	V_a	= max.	1100		V
Anode input power	W_{ia}	= max.	400		W
Anode dissipation	W_a	= max.	100		W
Anode current	I_a	= max.	400		mA
Grid 2 voltage	V_{g2}	= max.	300		V
Grid 2 dissipation	W_{g2}	= max.	12		W
Negative grid 1 voltage	$-V_{g1}$	= max.	150		V
Grid 1 current	I_{g1}	= max.	30		mA
Grid 1 circuit resistance	R_{g1}	= max.	25		kΩ
Heater to cathode voltage	V_{kf}	= max.	125		V

OPERATING CONDITIONS

Frequency	f	=	30	30	MHz
Anode voltage	V_a	=	750	1000	V
Grid 2 voltage	V_{g2}	=	250	250	V
Grid 1 voltage	V_{g1}	=	−90	−90	V
Anode current	I_a	=	385	385	mA
Grid 2 current	I_{g2}	=	20	20	mA
Grid 1 current	I_{g1}	=	7	6	mA
Peak grid 1 a.c. voltage	V_{g1p}	=	120	120	V
Anode input power	W_{ia}	=	285	385	W
Grid 1 input power	W_{ig1}	=	1,0	1,0	W
Grid 2 dissipation	W_{g2}	=	5	5	W
Anode dissipation	W_a	=	85	95	W
Output power	W_o	=	200	290	W
Efficiency	η	=	70	75	%

R.F. CLASS-C ANODE AND SCREEN GRID MODULATION

LIMITING VALUES (Absolute maximum rating system)

Frequency	f		up to	30	MHz
Anode voltage	V_a	= max.		650	V
Anode input power	W_{ia}	= max.		200	W
Anode dissipation	W_a	= max.		67	W
Anode current	I_a	= max.		350	mA
Grid 2 voltage	V_{g2}	= max.		300	V
Grid 2 dissipation	W_{g2}	= max.		10	W
Negative grid No. 1 voltage	$-V_{g1}$	= max.		150	V
Grid 1 current	I_{g1}	= max.		30	mA
Grid 1 circuit resistance	R_{g1}	= max.		25	kΩ
Heater to cathode voltage	V_{kf}	= max.		125	V

OPERATING CONDITIONS

Frequency	f	=		30	MHz
Anode voltage	V_a	=		600	V
Grid 2 voltage	V_{g2}	=		250	V
Grid 1 voltage	V_{g1}	=		−100	V
Anode current	I_a	=		300	mA
Grid 2 current	I_{g2}	=		20	mA
Grid 1 current	I_{g1}	=		4	mA
Peak grid No. 1 a.c. voltage	V_{g1p}	=		110	V
Anode input power	W_{ia}	=		180	W
Grid 1 input power	W_{ig1}	=		0,4	W
Grid 2 dissipation	W_{g2}	=		5	W
Anode dissipation	W_a	=		50	W
Output power	W_o	=		130	W
Efficiency	η	=		72	%
Modulation factor	m	=		100	%
Peak grid 2 a.c. voltage	V_{g2p}	=		220	V*
Modulation power	W_{mod}	=		90	W

* Obtained from a separate winding on the modulation transformer

R.F. CLASS-B SINGLE SIDE BAND AMPLIFIER

LIMITING VALUES (Absolute maximum rating system)

Frequency				
	f	up to	30	MHz
Anode voltage	V_a	= max.	825	V
Anode input power	W_{ia}	= max.	250	W
Anode dissipation	W_a	= max.	100	W
Anode current	I_a	= max.	400	mA
Grid 2 voltage	V_{g2}	= max.	350	V
Grid 2 dissipation	W_{g2}	= max.	12	W
Grid 1 circuit resistance	R_{g1}	= max.	25	kΩ
Heater to cathode voltage	V_{kf}	= max.	125	V

OPERATING CONDITIONS, with double tone modulation

The R.F. voltage is modulated with two sinusoidal A.F. signals of equal strength but different frequency.

Frequency	f	=	30	MHz	
Anode voltage	V_a	=	750	V	
Grid 2 voltage	V_{g2}	=	310	V	
Grid 1 voltage	V_{g1}	=	−45	V	(note 1)
Peak grid No. 1 a.c. voltage	V_{g1p}	=	0	45 V	(note 2)
Anode current	I_a	=	130	270 mA	
Grid 2 current	I_{g2}	=	< 5	26 mA	
Grid 1 current	I_{g1}	=	0	0 mA	
Anode input power	W_{ia}	=	98	200 W	
Grid 1 dissipation	W_{g1}	=	0	0 W	
Grid 2 dissipation	W_{g2}	=	1,5	8 W	
Anode dissipation	W_a	=	98	90 W	
Output power	W_o	=	0	220 W	(note 3)
Efficiency	η	=	—	55 %	

Notes
1. To be adjusted so that I_a = 130 mA at V_{g1p} = 0.
2. To be adjusted so that I_{g1} = 0.
3. Peak envelope power.

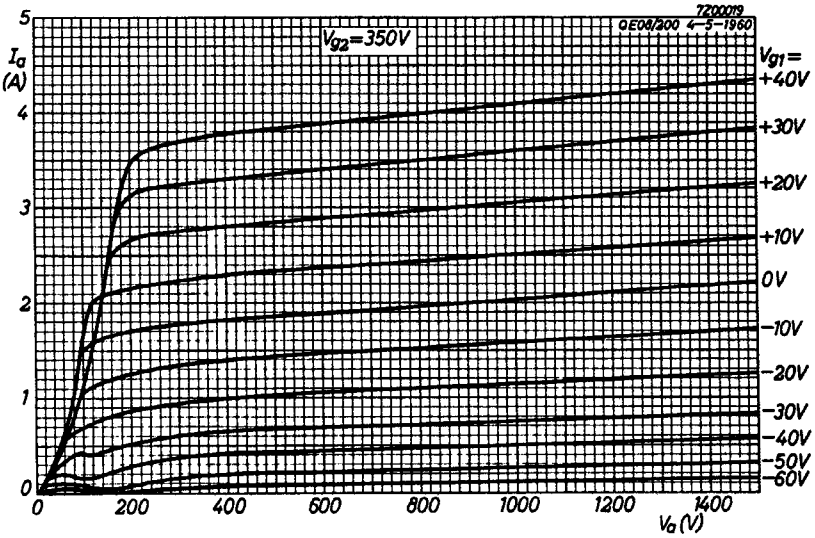
A.F. CLASS-B AMPLIFIER

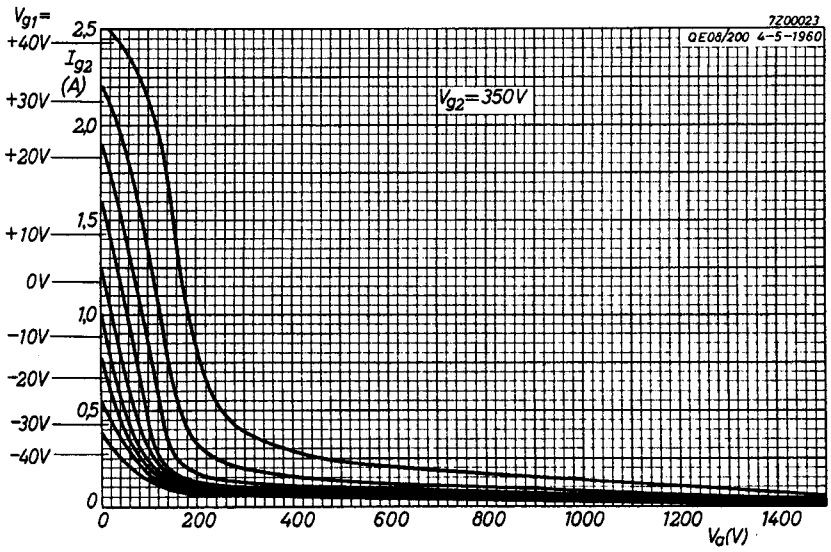
LIMTING VALUES (Absolute maximum rating system)

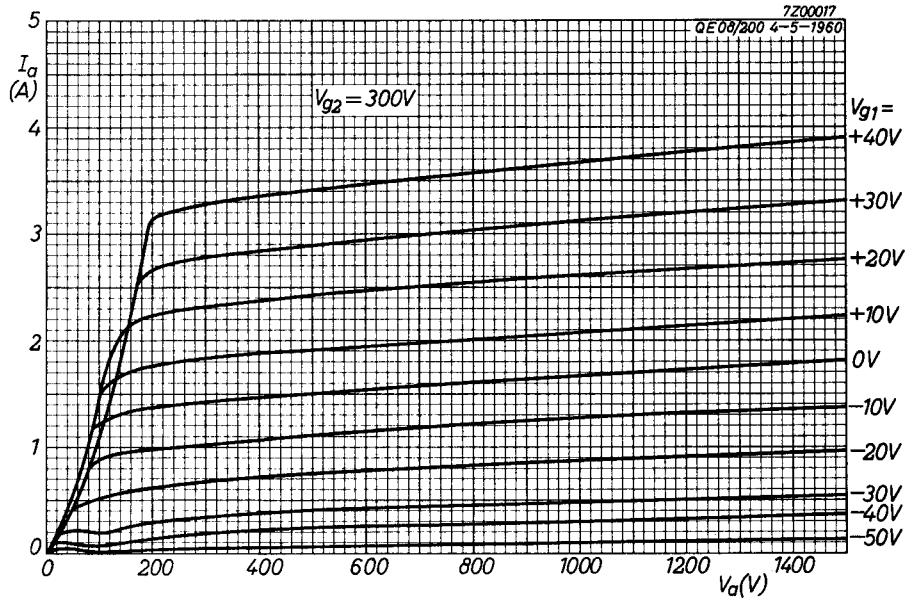
Anode voltage	V_a	= max.	825	V
Anode dissipation	W_a	= max.	100	W
Anode current	I_a	= max.	400	mA
Grid 2 voltage	V_{g2}	= max.	300	V
Grid 2 dissipation	W_{g2}	= max.	12	W
Negative grid No. 1 voltage	$-V_{g1}$	= max.	150	V
Grid 1 current	I_{g1}	= max.	30	mA
Grid 1 circuit resistance	R_{g1}	= max.	15	kΩ
Heater to cathode voltage	V_{kf}	= max.	125	V

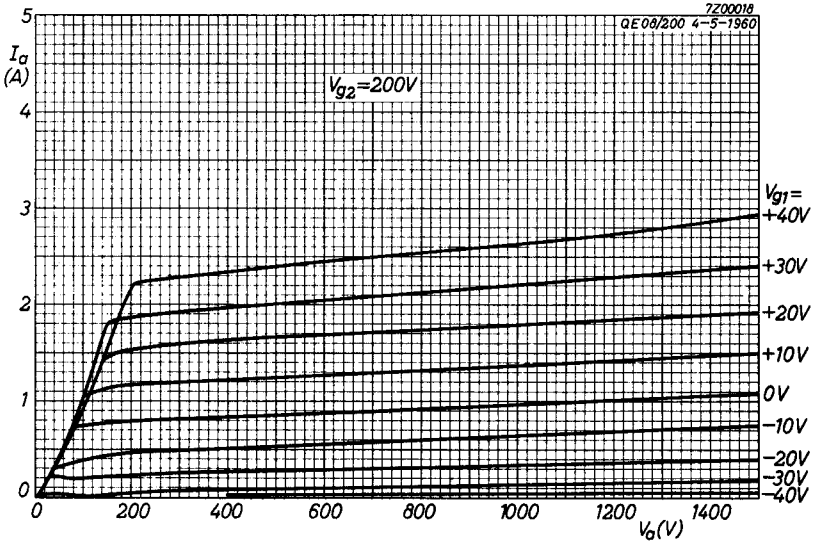
OPERATING CONDITIONS, two tubes

Anode voltage	V_a	=	750		600		V
Grid 2 voltage	V_{g2}	=	250		250		V
Grid 1 voltage	V_{g1}	=	−45		−45		V
Load resistance	$R_{aa\sim}$	=	3600		3500		Ω
Peak grid to grid voltage	V_{g1g1p}	=	0	110	0	105	V
Anode current	I_a	=	2x45	2x280	2x25	2x235	mA
Grid 2 current	I_{g2}	=	0	2x40	2x0,5	2x24	mA
Grid 1 current	I_{g1}	=	0	2x1	0	2x0,5	mA
Anode input power	W_{ia}	=	2x34	2x210	2x15	2x140	W
Grid 2 dissipation	W_{g2}	=	0	2x10	0	2x6	W
Anode dissipation	W_a	=	2x34	2x60	2x15	2x40	W
Output power	W_o	=	0	300	0	200	W
Total harmonic distortion	d_{tot}	=	–	6,5	–	5	%
Efficiency	η	=	–	71,5	–	71,5	%


7Z00019
QE08/200 4-5-1960
V_{g2}=350V
I_a (A)
V_{g1} =
+40V
+30V
+20V
+10V
0V
-10V
-20V
-30V
-40V
-50V
-60V
0
1
2
3
4
5
0
200
400
600
800
1000
1200
1400
V_a (V)


7Z00023
QE08/200 4-5-1960
V_{g1} =
+40V
+30V
+20V
+10V
0V
-10V
-20V
-30V
-40V
I_{g2} (A)
V_{g2}=350V
2,5
2,0
1,5
1,0
0,5
0
0
200
400
600
800
1000
1200
1400
V_a(V)


7Z00017
QE08/200 4-5-1960
I_a (A)
V_{g2} = 300V
V_{g1} =
+40V
+30V
+20V
+10V
0V
−10V
−20V
−30V
−40V
−50V
0
1
2
3
4
5
0
200
400
600
800
1000
1200
1400
V_a(V)


7Z00018
QE08/200 4-5-1960
I_a (A)
V_{g2}=200V
V_{g1} =
+40V
+30V
+20V
+10V
0V
−10V
−20V
−30V
−40V
0
1
2
3
4
5
0
200
400
600
800
1000
1200
1400
V_a(V)