THE M-O VALVE
COMPANY LIMITED

KT88

Genalex

BEAM TETRODE

BRIEF DATA

The KT88 has an absolute maximum anode dissipation rating of 42W and is designed for use in the output stage of an a.f. amplifier. Two valves in Class AB1 give a continuous output of up to 100W. The KT88 is also suitable for use as a series valve in a stabilised power supply.
The KT88 is a commercial version of the CV5220 and is similar to the 6550.

HEATER

V_h	6.3	V
I_h (approx)	1.6	A

MAXIMUM RATINGS

	Absolute	Design Maximum	
V_a	800	800	V
V_{g2}	600	600	V
$V_{a,g2}$	600	600	V
$-V_{g1}$	200	200	V
p_a	42	35	W
p_{g2}	8	6	W
p_{a+g2}	46	40	W
I_k	230	230	mA
V_{h-k}	250	200	V
T_{bulb}	250	250	°C
R_{g1-k} (cathode bias)			
$p_{a+g2} \leqslant 35W$	470		kΩ
$p_{a+g2} > 35W$	270		kΩ
R_{g1-k} (fixed bias)			
$p_{a+g2} \leqslant 35W$	220		kΩ
$p_{a+g2} > 35W$	100		kΩ

CAPACITANCES (Measured on a cold unscreened valve)

Triode Connection			Tetrode Connection		
$C_{g1\text{-}a,g2}$	7.9	pF	$C_{g1\text{-}a}$	1.2	pF
$C_{g1\text{-all less a,g2}}$	9.3	pF	$C_{g1\text{-all less a}}$	16	pF
$C_{a,g2\text{-all less g1}}$	17	pF	$C_{a\text{-all less g1}}$	12	pF

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CHARACTERISTICS

Tetrode Connected

V_a	250	V
V_{g2}	250	V
I_a	140	mA
I_{g2} (approx)	3	mA
$-V_{g1}$ (approx)	15	V
g_m	11.5	mA/V
r_a	12	kΩ
$\mu_{g1\text{-}g2}$	8	

Triode Connected

$V_{a,g2}$	250	V
I_{a+g2}	143	mA
$-V_{g1}$ (approx)	15	V
g_m	12	mA/V
r_a	670	Ω
μ	8	

TYPICAL OPERATION

Push-Pull. Class AB1. Cathode Bias. Tetrode Connection

$V_{a(b)}$	560	V
$V_{a(o)}$	521	V
V_{g2}	300	V
$I_{a(o)}$	2 x 64	mA
I_a (max sig)	2 x 73	mA
$I_{g2(o)}$	2 x 1.7	mA
I_{g2} (max sig)	2 x 9	mA
$R_{L(a\text{-}a)}$	9	kΩ
*R_k	2 x 460	Ω
$-V_{g1}$ (approx)	30	V
P_{out}	50	W
D_{tot}	3	%
†I.M.	11	%
$p_{a(o)}$	2 x 33	W
$p_{a(max\ sig)}$	2 x 12	W
$p_{g2(o)}$	2 x 0.5	W
p_{g2} (max sig)	2 x 2.7	W
$V_{g1\text{-}g1(a\text{-}a)}$ crest	60	V

*It is essential to use two separate cathode bias resistors.

†Intermodulation distortion: measured using two input signals at 50 and 5000Hz (ratio of amplitudes 4:1).

Push-Pull. Class AB1. Fixed Bias. Tetrode Connection

$V_{a(b)}$	560	V
$V_{a(o)}$	552	V
V_{g2}	300	V
$I_{a(o)}$	2 x 60	mA
I_a (max sig)	2 x 145	mA
$I_{g2(o)}$	2 x 1.7	mA
I_{g2} (max sig)	2 x 15	mA
$R_{L(a-a)}$	4.5	kΩ
*$-V_{g1}$ (approx)	34	V
P_{out}	100	W
D_{tot}	2.5	%
‡I.M.	10	%
$P_{a(o)}$	2 x 33	W
P_a (max sig)	2 x 28	W
$P_{g2(o)}$	2 x 0.5	W
P_{g2} (max sig)	2 x 4.5	W
$V_{(g1-g1)(ac)}$ crest	67	V

*It is essential to provide two separately adjustable bias voltage sources, having a voltage adjustment range of ±25%.
‡Intermodulation distortion; measured using two input signals at 50 and 6000Hz (ratio of amplitudes 4:1).

Push-Pull. Class AB1. Cathode Bias. Ultra-Linear Connection (40% Tapping Points)

$V_{a,g2(b)}$	500	375	V
$V_{a,g2(o)}$	436	328	V
$I_{a+g2(o)}$	2 x 87	2 x 87	mA
I_{a+g2} (max sig)	2 x 99	2 x 96	mA
$R_{L(a-a)}$	6	5	kΩ
*R_k	2 x 600	2 x 400	Ω
$-V_{g1}$ (approx)	52	35	V
P_{out}	50	30	W
D_{tot}	1.5	1	%
‡I.M.	4	3	%
$P_{a+g2(o)}$	2 x 38	2 x 28.5	W
P_{a+g2} (max sig)	2 x 17	2 x 16	W
$V_{(g1-g1)(ac)}$ crest	104	71	V
Z_{out}	4.8	4.5	kΩ

*It is essential to use two separate cathode bias resistors.
‡Intermodulation distortion; measured using two input signals at 50 and 6000Hz (ratio of amplitudes 4:1).

Push-Pull. Class AB1. Fixed Bias. Ultra-Linear Connection. (40% Tapping Points)

$V_{a,g2(b)}$	560	460	V
$V_{a,g2(o)}$	553	453	V
$I_{a+g2(o)}$	2 x 50	2 x 50	mA
I_{a+g2} (max sig)	2 x 157	2 x 140	mA
$R_{L(a-a)}$	4.5	4	kΩ
*$-V_{g1}$ (approx)	75	59	V
P_{out}	100	70	W
D_{tot}	2	2	%
*I.M.	11	10	%
$P_{a+g2(o)}$	2 x 27.5	2 x 22.5	W
P_{a+g2} (max sig)	2 x 33	2 x 27	W
$V_{(g1-g1)(ac)}$ crest	140	114	V
Z_{out}	7	6.5	kΩ

*It is essential to provide two separately adjustable bias voltage sources, having a voltage adjustment range of ±25%.
*Intermodulation distortion; measured using two input signals at 50 and 6000Hz (ratio of amplitudes 4:1).

Push-Pull. Class AB1. Cathode Bias. Triode Connection

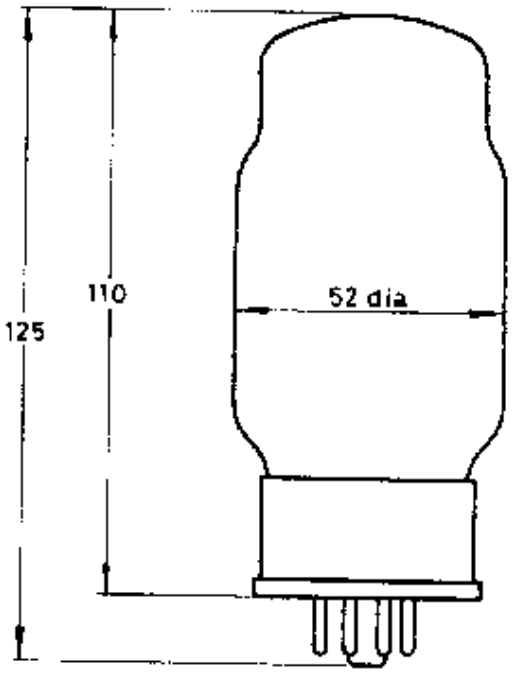
$V_{a,g2(b)}$	400	485	V
$V_{a,g2(o)}$	349	422	V
$I_{a+g2(o)}$	2 x 76	2 x 94	mA
I_{a+g2} (max sig)	2 x 80	2 x 101	mA
$R_{L(a-a)}$	4	4	kΩ
$-V_{g1}$ (approx)	40	50	V
P_{out}	17	31	W
D_{tot}	1.5	1.5	%
*I.M.	5.6	5.6	%
$P_{a+g2(o)}$	2 x 26.5	2 x 40	W
P_{a+g2} (max sig)	2 x 19	2 x 27	W
R_k	2 x 525	2 x 525	Ω
$V_{(g1-g1)(ac)}$ crest	78	114	V
Z_{out}	2	1.9	kΩ

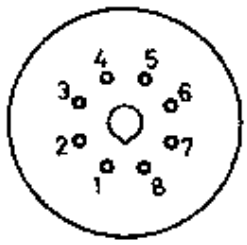
*Intermodulation distortion; measured using two input signals at 50 and 6000Hz (ratio of amplitudes 4:1).

INSTALLATION

The tube may be mounted either vertically or horizontally.
When tubes are mounted vertically it is recommended that the centres of the tube sockets are not less than 4in. apart and that pins 4 and 8 of each tube are in line.
When tubes are mounted horizontally it is recommended that the centres of the tube sockets are not less than 4in. apart and that pins 4 and 8 of each tube are in the same vertical line. One tube should not be mounted directly above another.
Free air circulation around the tube is desirable.

OUTLINE

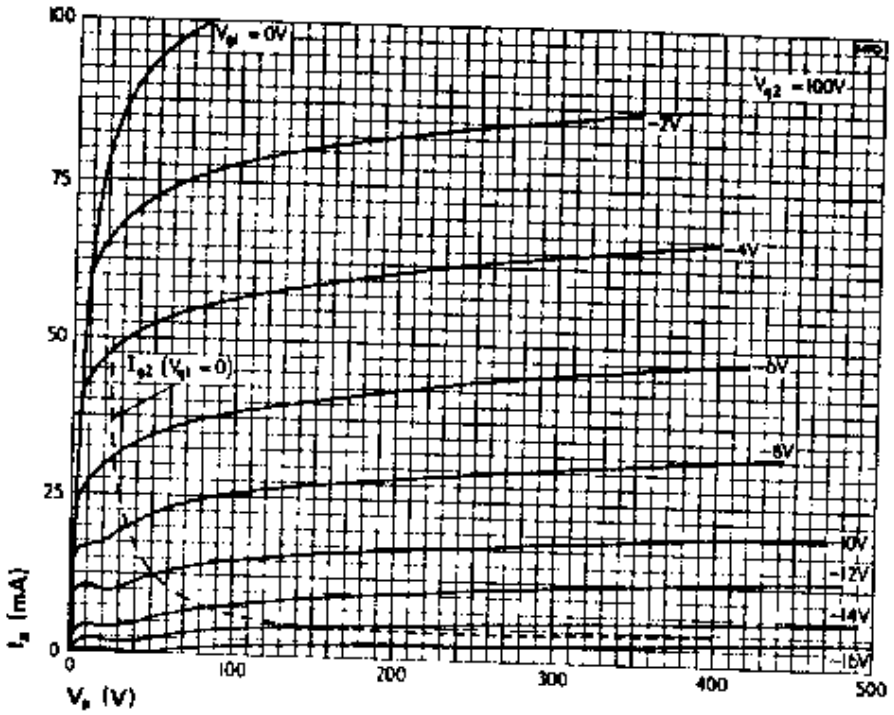


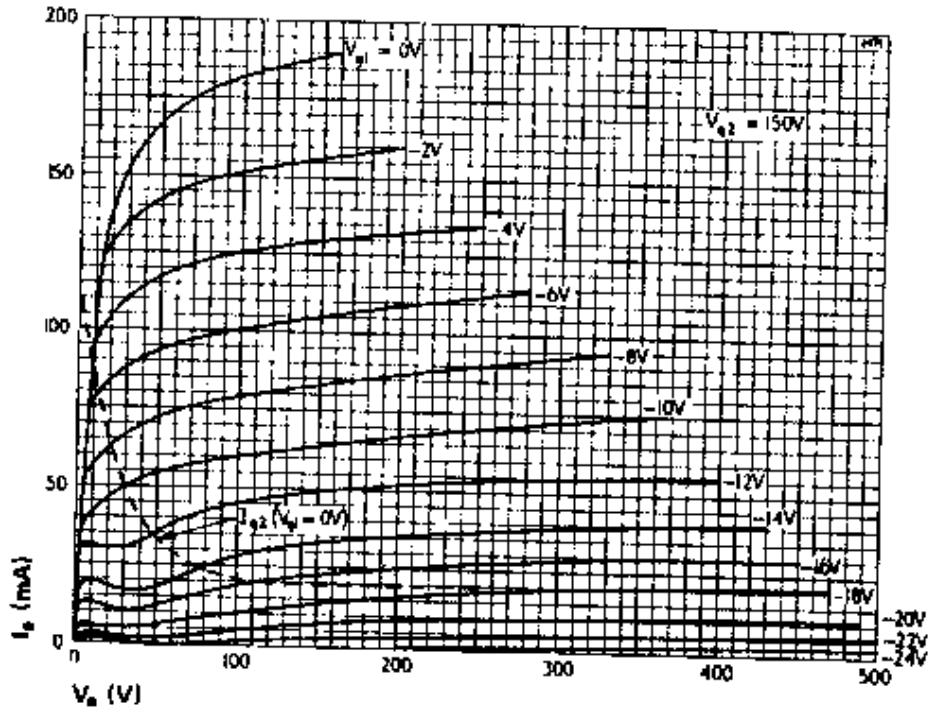


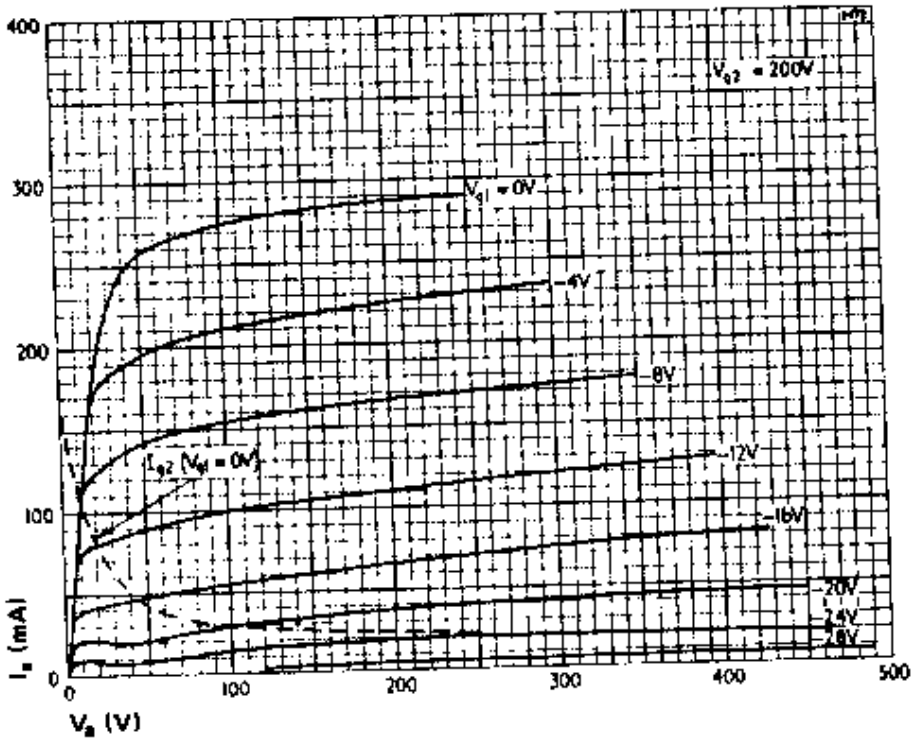
Base : Metal shell wafer octal

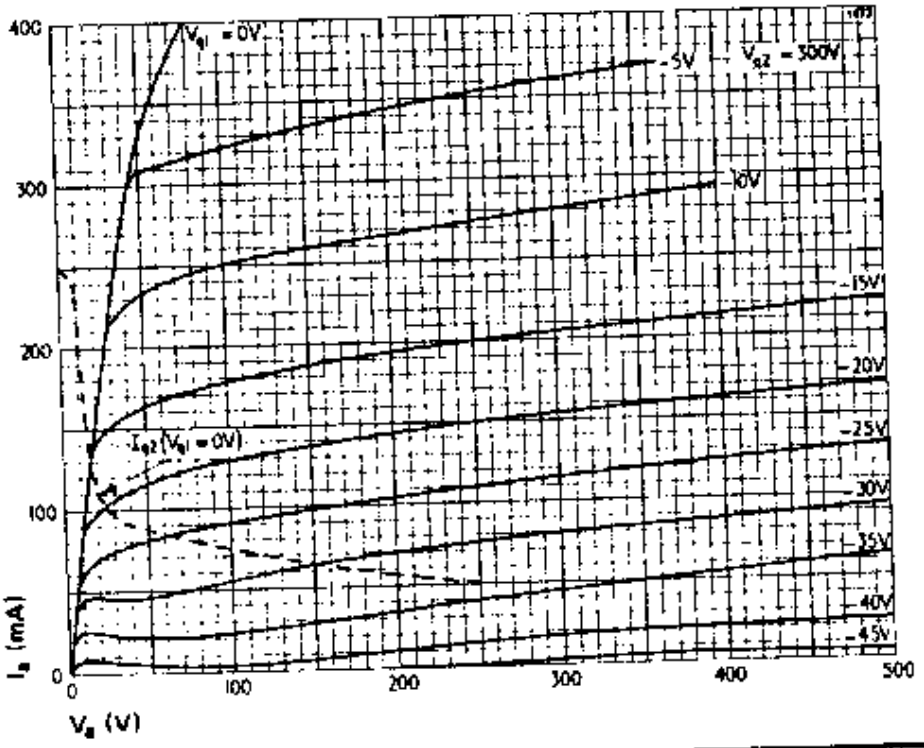
Pin:				
	1	base shell	5	g1
	2	h	6	NP
	3	a	7	h
	4	g2	8	k,bp

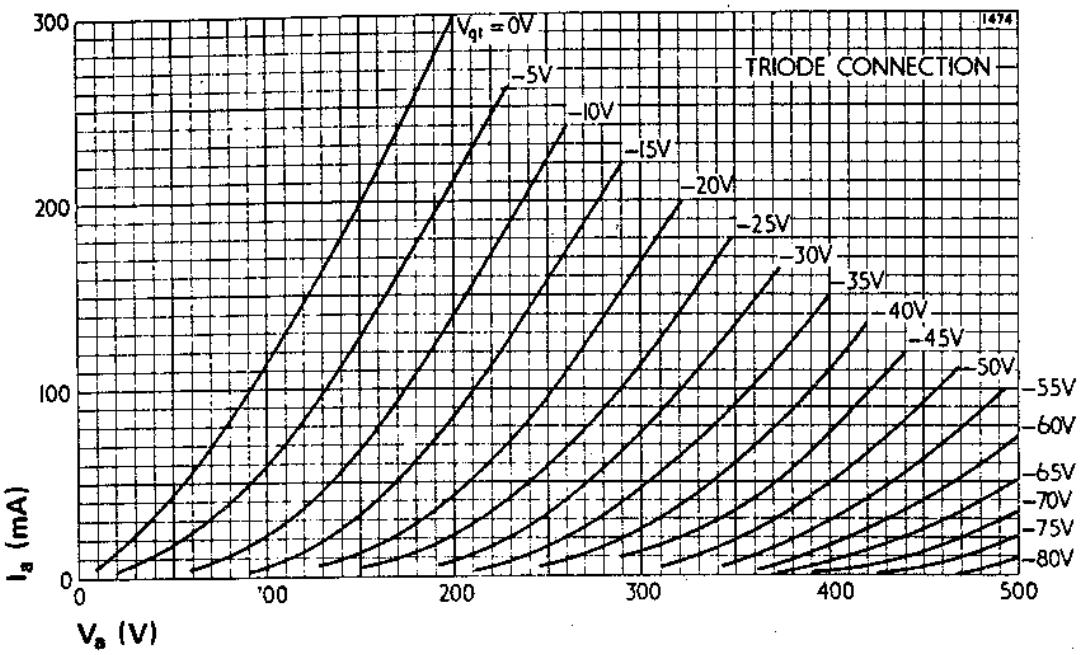
Dimensions are in mm and are maximum

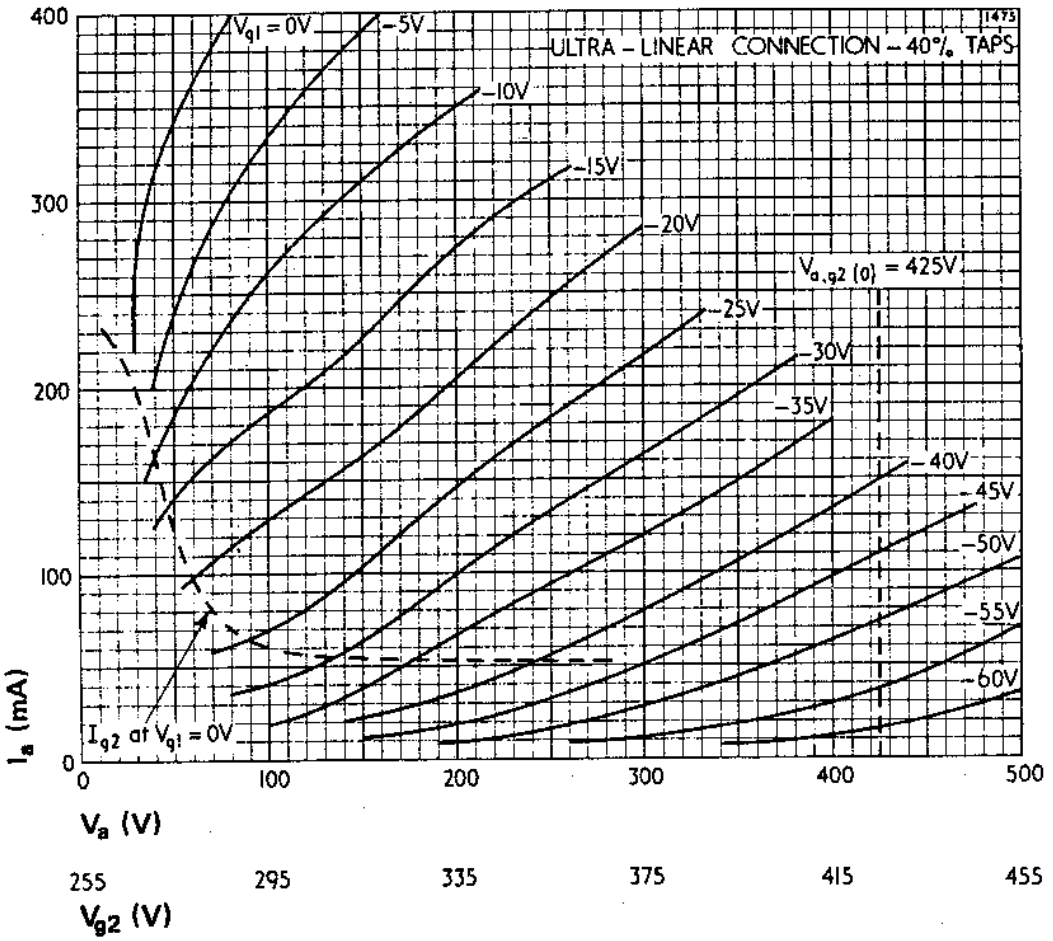

100
75
50
25
0
I_a (mA)
0
100
200
300
400
500
V_a (V)
V_{g1} = 0V
V_{g2} = 100V
-2V
-4V
-6V
-8V
-10V
-12V
-14V
-16V
I_{g2} (V_{g1} = 0)


200
150
100
50
0
I_a (mA)
0
100
200
300
400
500
V_a (V)
V_{g1} = 0V
V_{g2} = 150V
-2V
-4V
-6V
-8V
-10V
-12V
-14V
-16V
-18V
-20V
-22V
-24V
I_{g2} (V_{g1} = 0V)


V_{g2} = 200V
V_{g1} = 0V
-4V
-8V
-12V
-16V
-20V
-24V
-28V
I_{g2} (V_{g1} = 0V)
I_a (mA)
V_a (V)
0
100
200
300
400
500


V_{g1} = 0V
-5V
V_{g2} = 300V
-10V
-15V
-20V
-25V
-30V
-35V
-40V
-45V
I_{g2} (V_{g1} = 0V)
I_a (mA)
V_a (V)
0
100
200
300
400
500


1474
TRIODE CONNECTION
V_{g1} = 0V
-5V
-10V
-15V
-20V
-25V
-30V
-35V
-40V
-45V
-50V
-55V
-60V
-65V
-70V
-75V
-80V
300
200
100
0
0
100
200
300
400
500
I_a (mA)
V_a (V)


1475
ULTRA – LINEAR CONNECTION – 40% TAPS
V_{g1} = 0V
-5V
-10V
-15V
-20V
$V_{a,g2}$ (0) = 425V
-25V
-30V
-35V
-40V
-45V
-50V
-55V
-60V
I_{g2} at V_{g1} = 0V
400
300
200
100
0
0
100
200
300
400
500
I_a (mA)
V_a (V)
255
295
335
375
415
455
V_{g2} (V)

G.E.C. VALVES

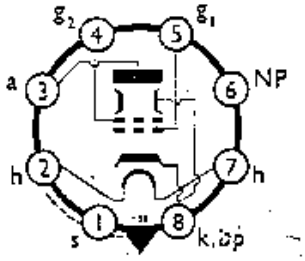
OUTPUT BEAM PENTODE
6·3V INDIRECTLY HEATED

KT88

NOVEMBER, 1956

The KT88 is a pentode having an anode dissipation of 35W. It is primarily designed for use in the output stage of an AF amplifier in which two valves will provide up to 100W.

BASE CONNECTIONS AND VALVE DIMENSIONS



View from underside of base.

Base : Octal
Bulb : Tubular

Max. overall length :	125	m.m.
Max. seated length :	110	m.m.
Max. diameter :	52	m.m.

HEATER

V_h	6·3	V
I_h	1·8	A

MAXIMUM RATINGS

V_a	600	V
V_{g2}	600	V
*$V_{a,\ g2}$	600	V
p_a	35	W
p_{g2}	6	W
*p_{a+g2}	40	W
I_k	174	mA
V_{h-k}	150	V

*Triode connection.

CAPACITANCES

c_{g-a}	1·2	pF	c_{in}	16	pF	c_{out}	12	pF

CHARACTERISTICS

Pentode Connection			Triode Connection		
V_a	250	V	$V_{a,\ g2}$	450	V
V_{g2}	250	V	V_{g1}	−46	V
I_a	140	mA	g_m	13	mA/V
g_m	11	mA/V	r_a	6150	Ω
r_a	12	kΩ	μ	8	
μ_{g1-g2}	8				

TYPICAL OPERATION

Pentode connection. Push-pull. Cathode Bias.
Data per pair.

V_a (b)	400	450	475	V
V_a	360	400	425	V
V_{g2}	255	295	320	V
I_a (b)	120	140	160	mA
I_a (max sig)	135	155	180	mA
I_{g2} (o)	7·5	10	12	mA
I_{g2} (max sig)	25	30	38	mA
p_a (o) (per valve)	22·5	30	35	W
p_a (max sig) (per valve)	8	10	15	W
p_{g2} (o) (per valve)	1	1·5	2	W
p_{g2} (max sig) (per valve)	3·25	4·5	6	W

KT88

*R_k (per valve)	440 ± 5%	440 ± 5%	440 ± 5%	Ω
V_k (o) (app)	28	34	38	V
V_{in} (g1−g1)	50	60	70	V
R_L (a−a)	6000	6000	6000	Ω
z_{out}	15000	15000	15000	Ω
P_{out}	34	42	48	W
D	3	3	3	%

*Separate bias resistors are essential.

Pentode connection Push-Pull. Fixed Bias.
Data per pair.

V_a (b)	460	625	V
V_a	450	600	V
V_{g2}	345	330	V
I_a (o)	100	100	mA
I_a (max sig)	240	250	mA
I_{g2} (o)	7·5	6	mA
I_{g2} (max sig)	35	32	mA
p_a (o) (per valve)	25	32	W
p_a (max sig) (per valve)	20	25	W
p_{g2} (o) (per valve)	1·5	1	W
p_{g2} (max sig) (per valve)	6	5·5	W
*V_{g1} (app)	−48	−45	V
V_{in} (g1−g1) (app)	70	50	V
R_L (a−a)	4000	5000	Ω
z_{out}	15	25	kΩ
p_{out}	65	100	W
†D	5—7	3·6	%

*A bias voltage range of not less than 40 to 65 is recommended.

†The distortion may vary accordingly to matching of pairs.

Triode Connection. Push-Pull. Cathode Bias.
Data per pair.

V_a (b)	400	485	V
V_a, g2	350	425	V
I_{a+g2} (o)	135	170	mA
I_{a+g2} (max sig)	145	180	mA
p_{a+g2} (o) (per valve)	24	40	W
*R_k	560 ± 5%	560 ± 5%	Ω
V_k (o)	38	48	V
V_{in} (g1−g1) (app)	60	70	V
R_L (a−a)	4000	4000	Ω
z_{out}	2000	2000	Ω
P_{out}	15	27	W
†D	1—3	1—3	%

*Separate bias resistors are essential.

†The distortion varies between 1% and 3% according to the degree of matching.

The external grid circuit resistance should be kept as low as possible and must not exceed 220kΩ ± 20% with cathode bias, or 100kΩ ± 20% with fixed bias.

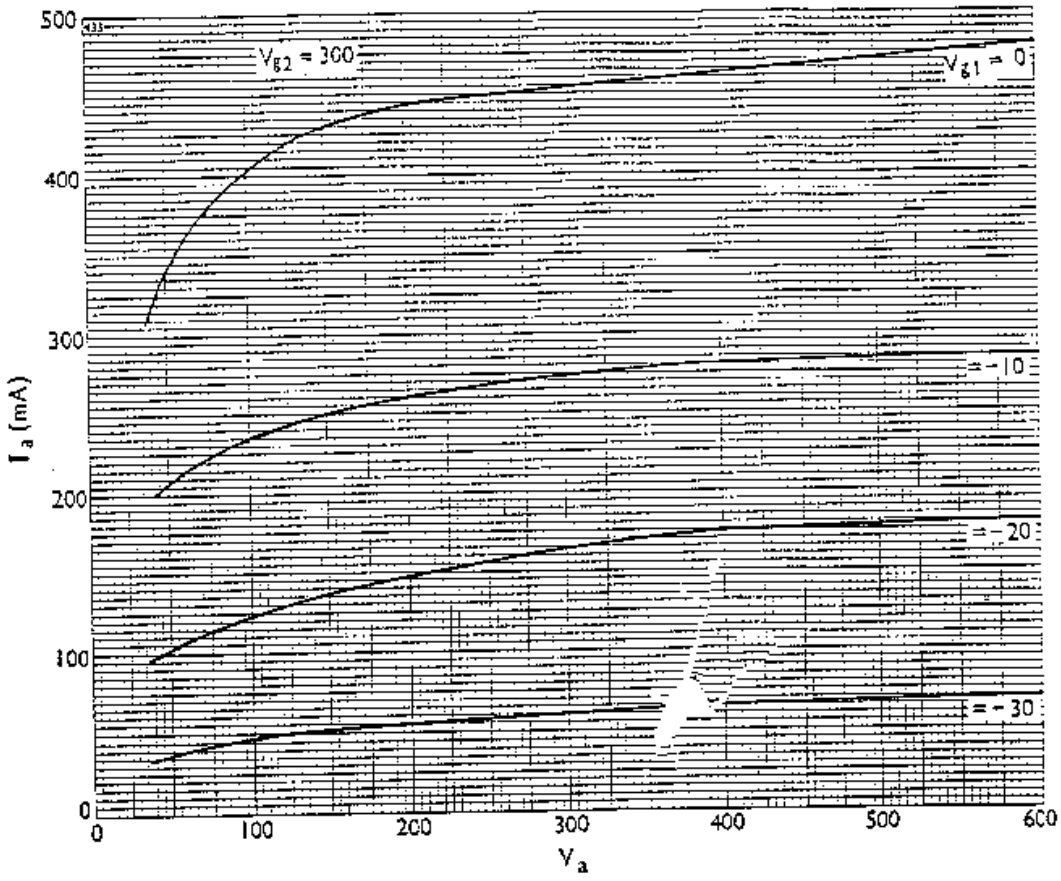
MOUNTING

Any position.

VENTILATION

Free air circulation is preferable. The hottest part of the bulb must not exceed 250°C.

KT88


500
400
300
200
100
0
I_a (mA)
V_{g2} = 300
V_{g1} = 0
= −10
= −20
= −30
0
100
200
300
400
500
600
V_a