

OUTPUT PENTODE

EL34

Output pentode rated for 25W anode dissipation,
intended for use in a.c. mains operated equipment.

PRELIMINARY DATA

HEATER

V_h	6.3	V
I_h	1.5	A

CAPACITANCES

C_{out}	7.2	pF
C_{in}	15.5	pF
C_{a-g1}	<1.1	pF
C_{g1-h}	<1.0	pF
C_{k-h}	11	pF

CHARACTERISTICS

V_a	250	V
V_{g2}	250	V
V_{g3}	0	V
I_a	100	mA
I_{g2}	14.9	mA
V_{g1}	-13.5	V
g_m	11	mA/V
r_a	15	k Ω
μ_{g1-g2}	11	

OPERATING CONDITIONS AS SINGLE VALVE CLASS "A" AMPLIFIER

Pentode connection

V_a	250	V
V_{g2}	250	V
V_{g3}	0	V
V_{g1}	-13.5	V
R_k	120	Ω
I_a	100	mA
I_{g2}	14.9	mA
R_a	2.0	k Ω
V_{in} (r.m.s.) ($P_{out}=50mW$)	0.5	V
* P_{out}	11	W
V_{in} (r.m.s.)	8.7	V
* D_{tot}	10	%

* P_{out} and D_{tot} are measured at fixed bias and therefore represent the power output available during the reproduction of speech and music. When a sustained sine wave is applied to the control grid the bias across the cathode resistor will readjust itself as a result of the increased anode and screen-grid currents. This will result in approximately 10% reduction in power output.

Output pentode rated for 25W anode dissipation, intended for use in a.c. mains operated equipment.

OPERATING CONDITIONS FOR TWO VALVES IN PUSH-PULL

Distributed load conditions with screen-grid tapping at 43% of primary turns

$V_{a+} V_{Rk}$	430	430	V
R_{g2} (per valve)	1	1	k Ω
$V_{g2+} V_{Rk}$	425	425	V
$I_{a(o)}$	2×62.5	2×62.5	mA
I_a (max. sig.)	2×65	2×70	mA
$I_{g2(o)}$	2×5.0	2×5.0	mA
I_{g2} (max. sig.)	2×5.1	2×7.5	mA
R_k (per valve)	470	470	Ω
$V_{in(g1-g1)}$ r.m.s.	32	52	V
R_{a-a}	6.6	6.6	k Ω
P_{out}	20	37	W
D_{tot}	0.8	1.3	%

OPERATING CONDITIONS FOR TWO VALVES IN PUSH-PULL

Fixed bias

V_b	425	375	V
$*R_{g2}$	1000	470	Ω
V_{g3}	0	0	V
$I_{a(o)}$	2×30	2×35	mA
I_a (max. sig.)	2×120	2×120	mA
$I_{g2(o)}$	2×4.4	2×4.7	mA
I_{g2} (max. sig.)	2×25	2×25	mA
V_{g1}	-38	-32	V
R_{a-a}	3.4	2.8	k Ω
$V_{in(g1-g1)}$ r.m.s.	54	45	V
P_{out}	55	44	W
D_{tot}	5.0	5.0	%

*Screen-grid resistor common to both valves.

These operating conditions apply with a stabilised line voltage and allow for a 25V drop in the primary winding of the output transformer at maximum signal. If there is an additional drop of 25V in the h.t. line voltage at maximum signal $P_{out}=45W$ and 36W. The optimum anode-to-anode load under these conditions are 4.0k Ω and 3.8k Ω respectively.

Output pentode rated for 25W anode dissipation,
intended for use in a.c. mains operated equipment.

OPERATING CONDITIONS FOR TWO VALVES IN PUSH-PULL

With separate screen-grid supply and fixed bias

$V_{b(a)}$	500	800	V
$V_{b(g2)}$	400	400	V
* R_{g2}	750	750	Ω
V_{g3}	0	0	V
$I_{a(0)}$	2×30	2×25	mA
I_a (max. sig.)	2×125	2×91	mA
$I_{g2(0)}$	2×4.0	2×3.0	mA
I_{g2} (max. sig.)	2×25	2×19	mA
V_{g1}	-36	-39	V
R_{a-a}	4.0	11	k Ω
$V_{in(g1-g1)}$ r.m.s.	51	47	V
P_{out}	70	100	W
D_{tot}	5.0	5.0	%

*Screen-grid resistor common to both valves.

These operating conditions apply with stabilised line voltages and allow for a 25V drop in the primary winding of the output transformer at maximum signal. If there is an additional drop of 25V in the line voltages at maximum signal $P_{out}=58W$ and 90W. The optimum anode-to-anode load under these conditions are 5.0k Ω and 11k Ω respectively.

OPERATING CONDITIONS FOR TWO VALVES IN PUSH-PULL

Cathode bias

V_b	375	V
* R_{g2}	470	Ω
† R_k	130	Ω
V_{g3}	0	V
$I_{a(0)}$	2×75	mA
I_a (max. sig.)	2×95	mA
$I_{g2(0)}$	2×11.5	mA
I_{g2} (max. sig.)	2×22.5	mA
R_{a-a}	3.4	k Ω
$V_{in(g1-g1)}$ r.m.s.	42	V
P_{out}	35	W
D_{tot}	5.0	%

*Screen-grid resistor common to both valves.

†Common cathode bias resistor.

These operating conditions allow for a 20V drop in the primary winding of the output transformer and a 5V drop in the h.t. line voltage at maximum signal.

Output pentode rated for 25W anode dissipation,
intended for use in a.c. mains operated equipment.

OPERATING CONDITIONS AS SINGLE VALVE CLASS "A" AMPLIFIER

Triode connection (g_2 connected to a, g_3 to k)

$V_{a+} V_{Rk}$	375	V
V_{g3}	0	V
R_k	370	Ω
I_a	70	mA
V_{g1}	-26	V
R_a	3.0	k Ω
V_{in} (r.m.s.) ($P_{out}=50mW$)	1.7	V
P_{out}	6.0	W
V_{in} (r.m.s.)	18.9	V
D_{tot}	8.0	%

OPERATING CONDITIONS FOR TWO VALVES IN PUSH-PULL

Triode connection (g_2 connected to a, g_3 to k)

$V_{a+} V_{Rk}$	400	430	V
V_{g3}	0	0	V
* R_k	220	†250	Ω
$I_{a(o)}$	2×65	2×64	mA
I_a (max. sig.)	2×71	2×67	mA
V_{g1}	-29	-32	V
R_{a-a}	5.0	10	k Ω
V_{in} (g_1-g_1) r.m.s.	44	48	V
P_{out}	16	14	W
D_{tot}	3.0	<1.0	%

*Common cathode bias resistor.

†Un-bypassed.

LIMITING VALUES

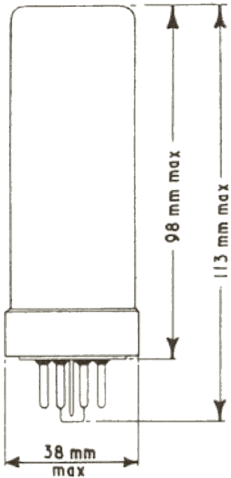
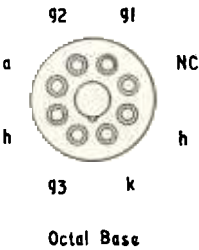
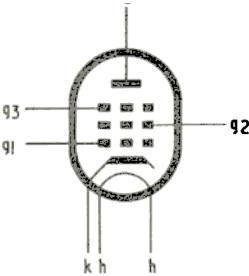
$V_{a(b)}$ max.	2.0	kV
V_a max.	800	V
p_a max.	25	W
p_a max. (max. signal speech and music)	27.5	W
$V_{g2(b)}$ max.	800	V
V_{g2} max.	425	V
p_{g2} max.	8.0	W
I_k max.	150	mA
V_{g1} max. ($I_{g1}=+0.3\mu A$)	-1.3	V
R_{g1-k} max. (cathode bias)	700	k Ω
R_{g1-k} max. (fixed bias)	500	k Ω
V_{h-k} max.	100	V
R_{h-k} max.	20	k Ω

OUTPUT PENTODE

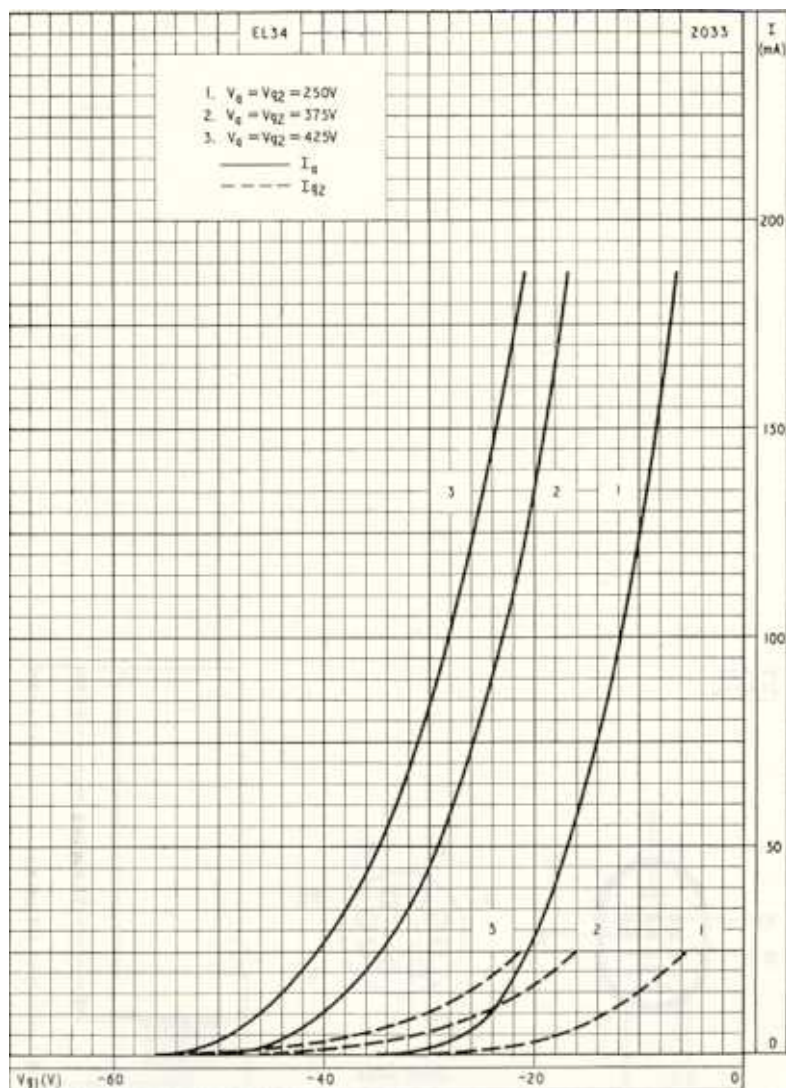
EL34

*Output pentode rated for 25W anode dissipation,
intended for use in a.c. mains operated equipment.*

1933



Output pentode rated for 25W anode dissipation,
intended for use in a.c. mains operated equipment.

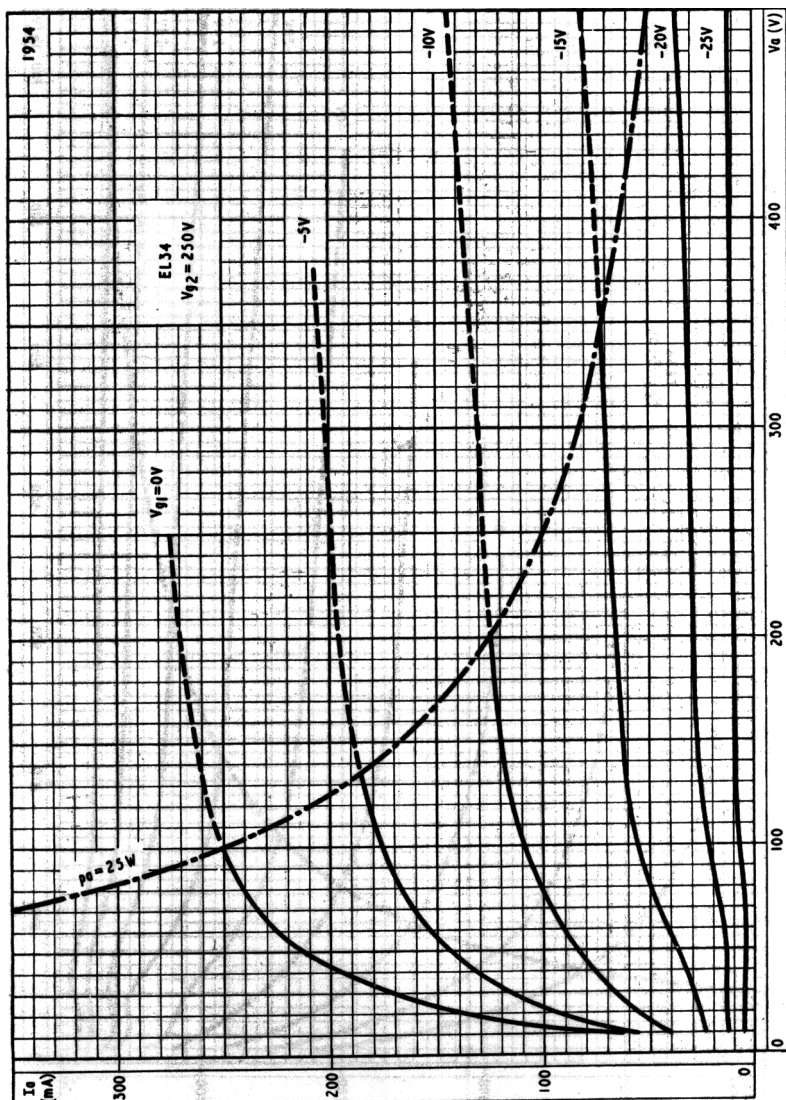


ANODE AND SCREEN-GRID CURRENT PLOTTED AGAINST CONTROL GRID VOLTAGE

OUTPUT PENTODE

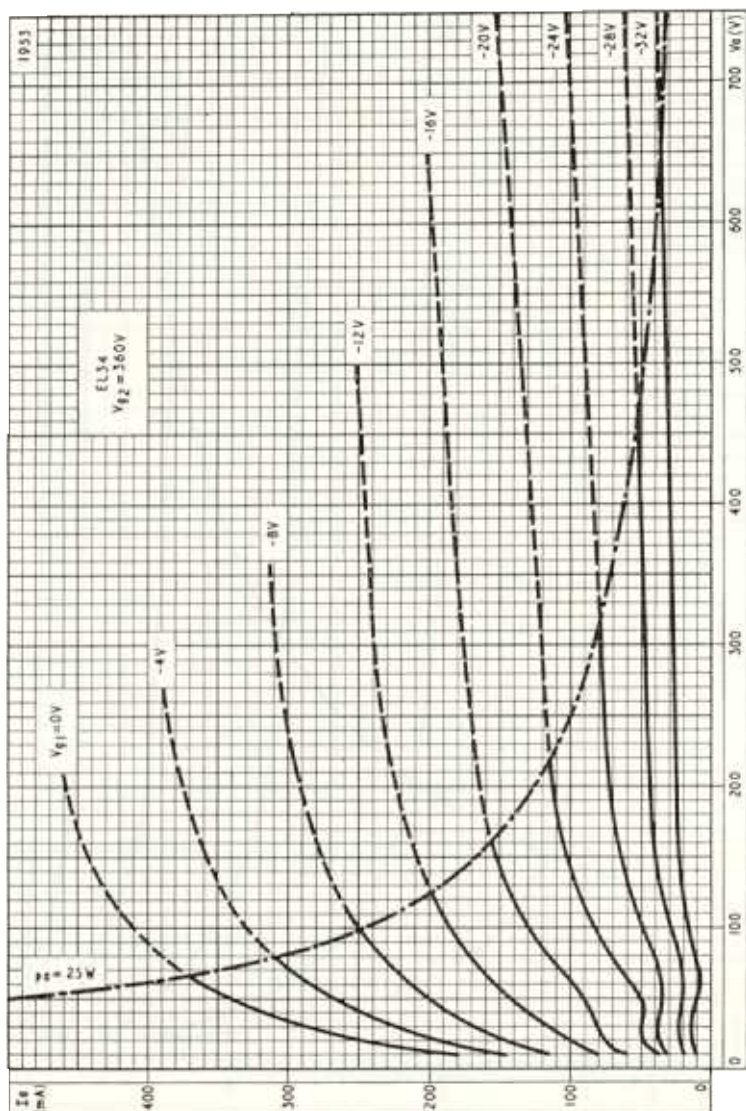
EL34

Output pentode rated for 25W anode dissipation,
intended for use in a.c. mains operated equipment.



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

Output pentode rated for 25W anode dissipation,
intended for use in a.c. mains operated equipment.

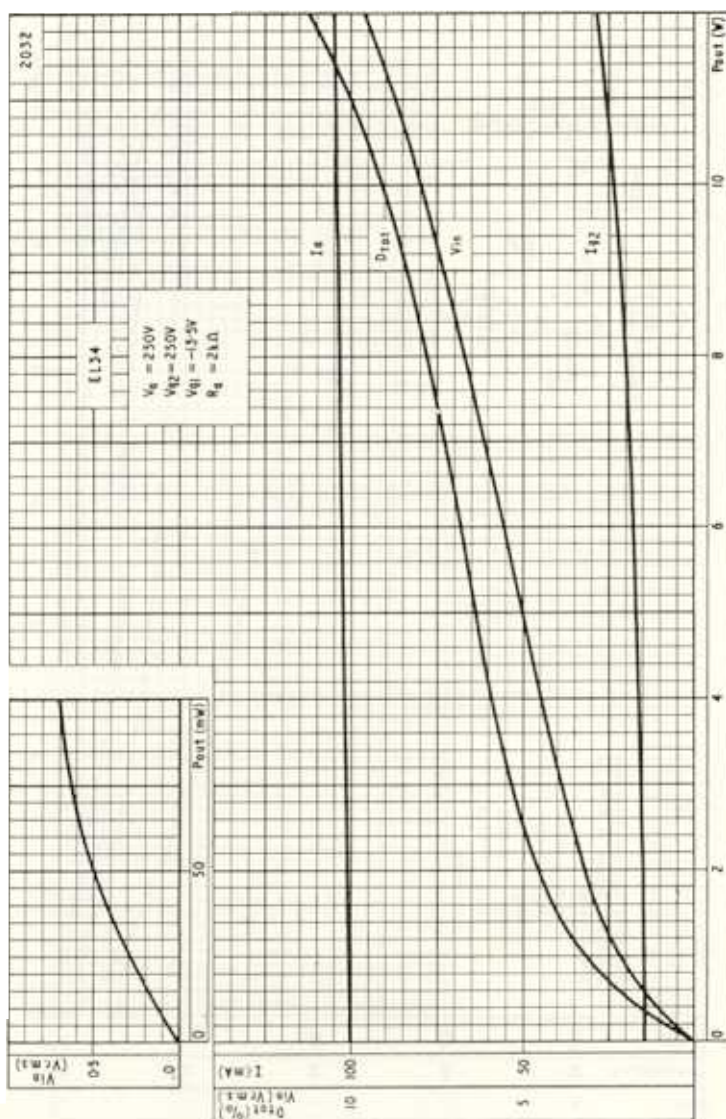


ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH
CONTROL GRID VOLTAGE AS PARAMETER $V_{g2} = 360V$

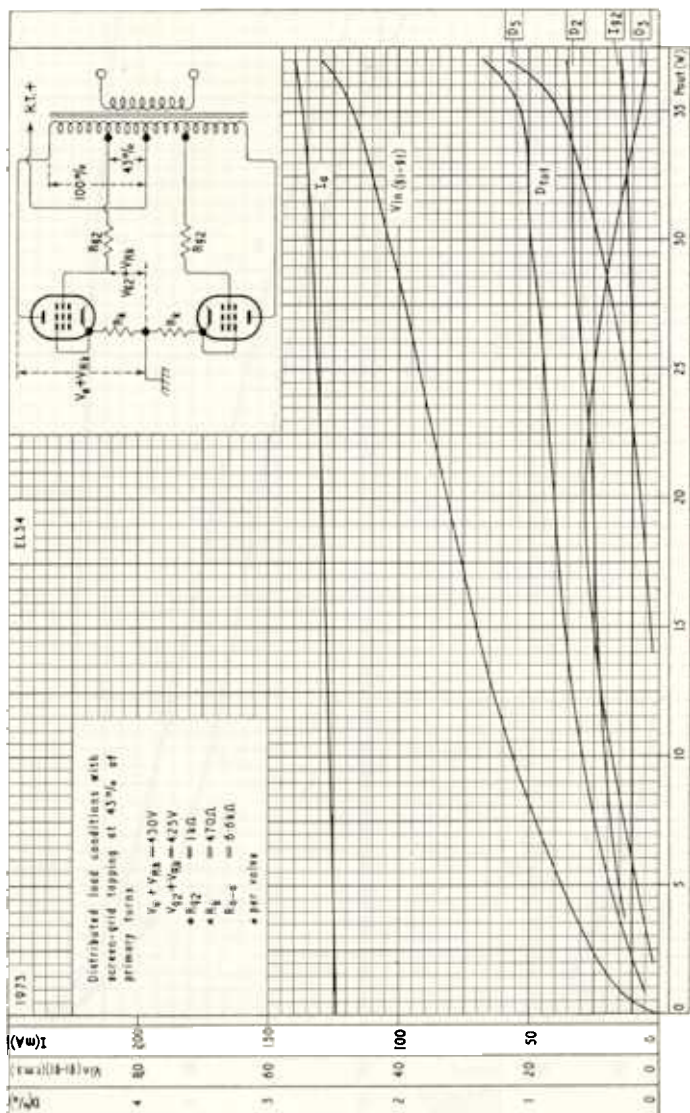
OUTPUT PENTODE

EL34

Output pentode rated for 25W anode dissipation,
intended for use in a.c. mains operated equipment.



Output pentode rated for 25W anode dissipation, intended for use in a.c. mains operated equipment.

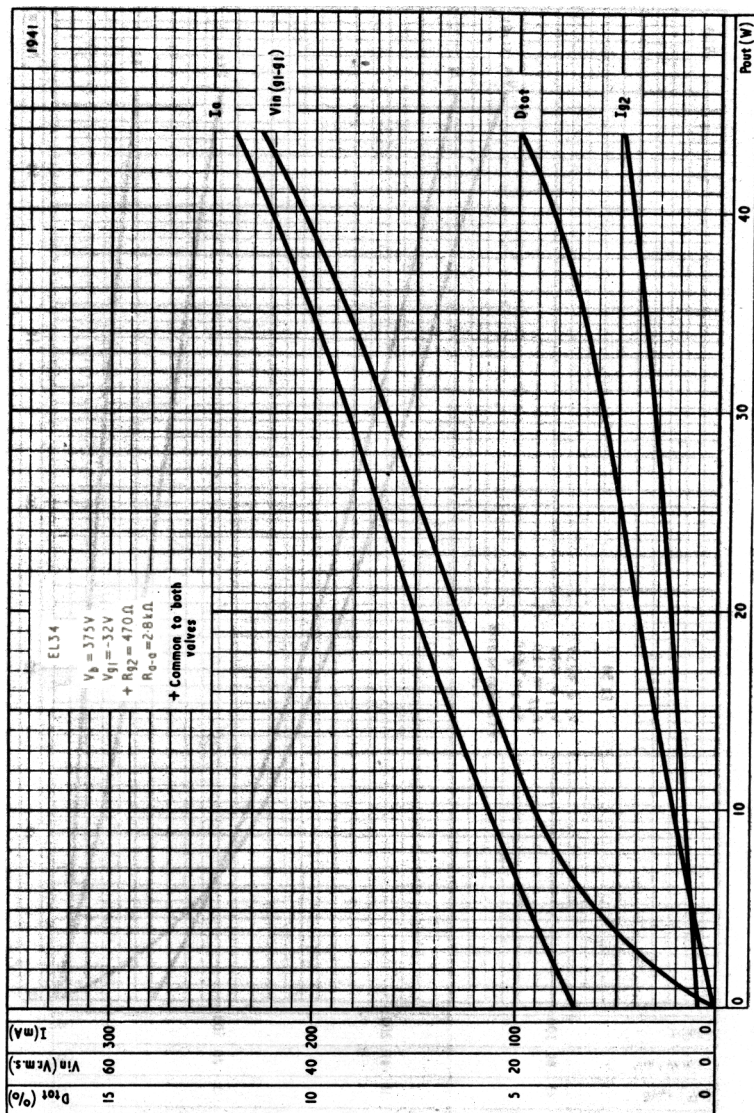


PERFORMANCE OF TWO EL34 IN PUSH-PULL WITH DISTRIBUTED LOAD CONDITIONS. SCREEN-GRID TAPPING AT 43% OF PRIMARY TURNS

OUTPUT PENTODE

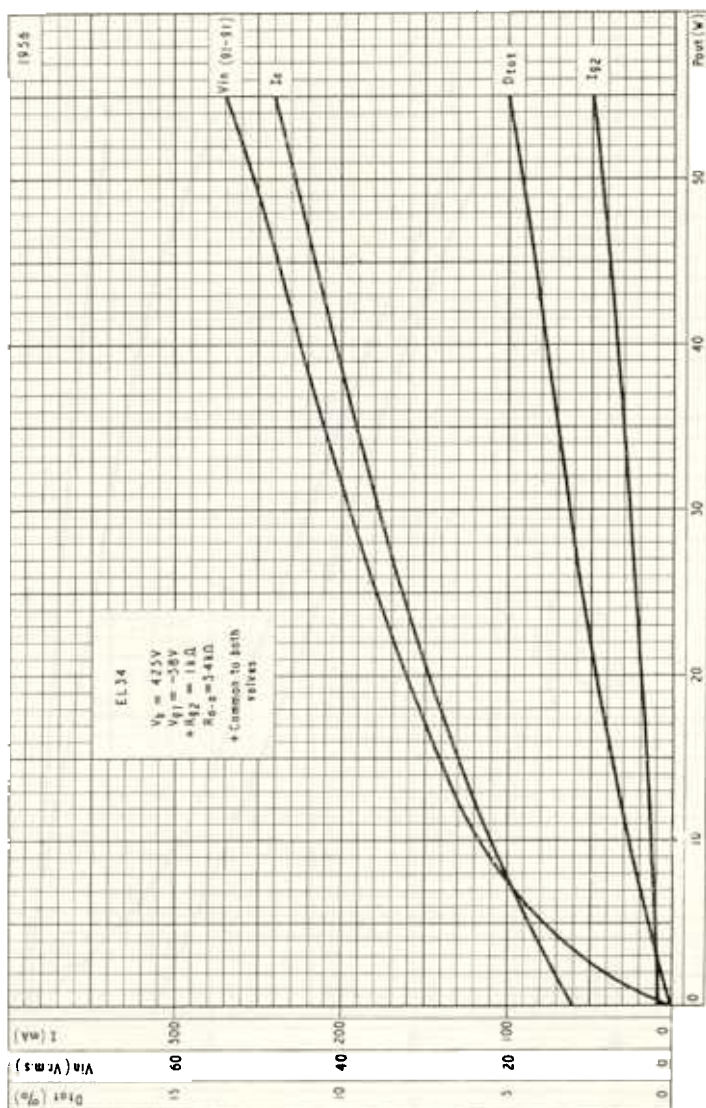
Output pentode rated for 25W anode dissipation, intended for use in a.c. mains operated equipment.

EL34



PERFORMANCE OF TWO EL34 IN PUSH-PULL WITH FIXED BIAS AND $V_b=375V$

Output pentode rated for 25W anode dissipation,
intended for use in a.c. mains operated equipment.

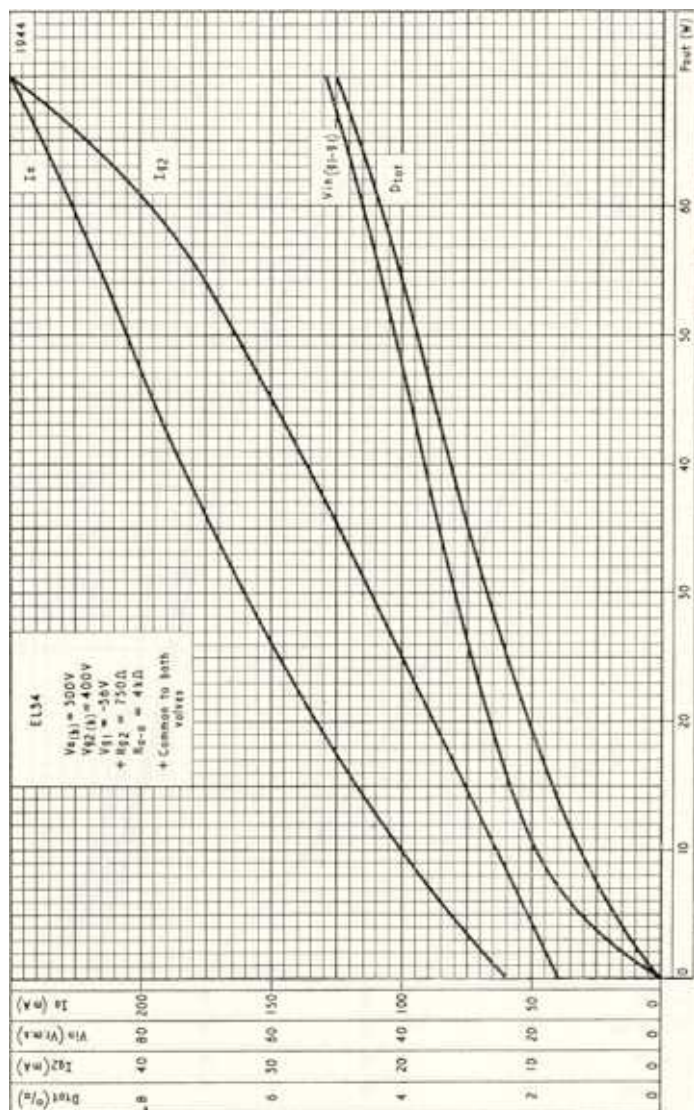


PERFORMANCE OF TWO EL34 IN PUSH-PULL WITH FIXED BIAS AND $V_b=425V$

OUTPUT PENTODE

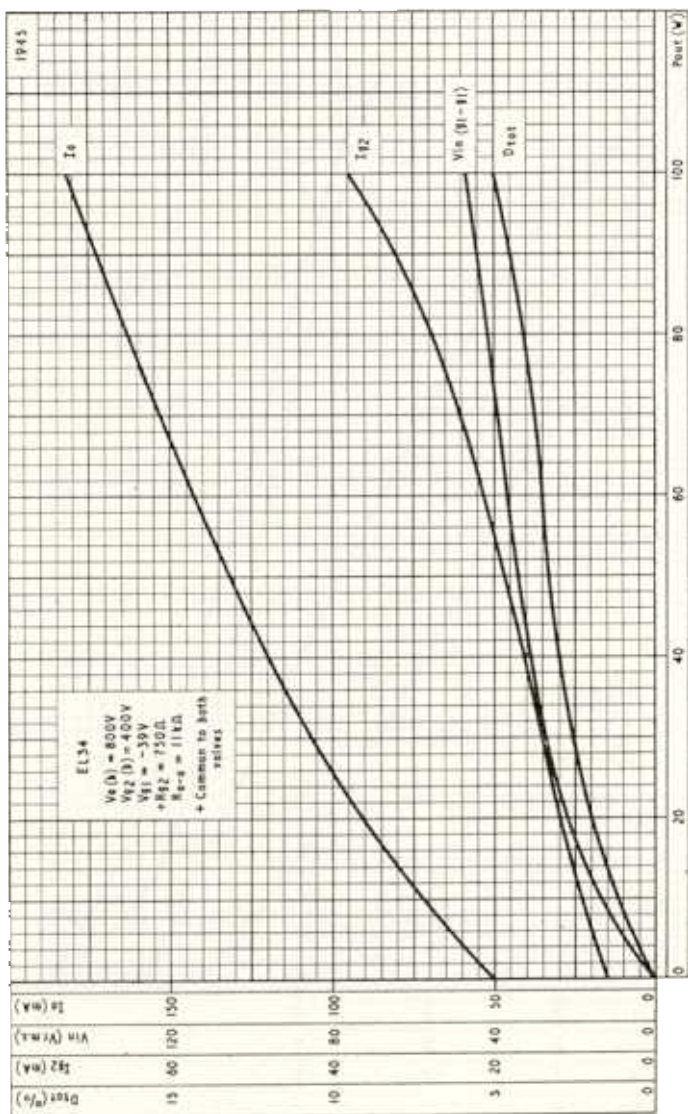
EL34

Output pentode rated for 25W anode dissipation,
intended for use in a.c. mains operated equipment.



PERFORMANCE OF TWO EL34 IN PUSH-PULL WITH SEPARATE ANODE
AND SCREEN-GRID VOLTAGE SUPPLIES AND FIXED BIAS $V_{a(b)}=500V$,
 $V_{g2(b)}=400V$

Output pentode rated for 25W anode dissipation, intended for use in a.c. mains operated equipment.

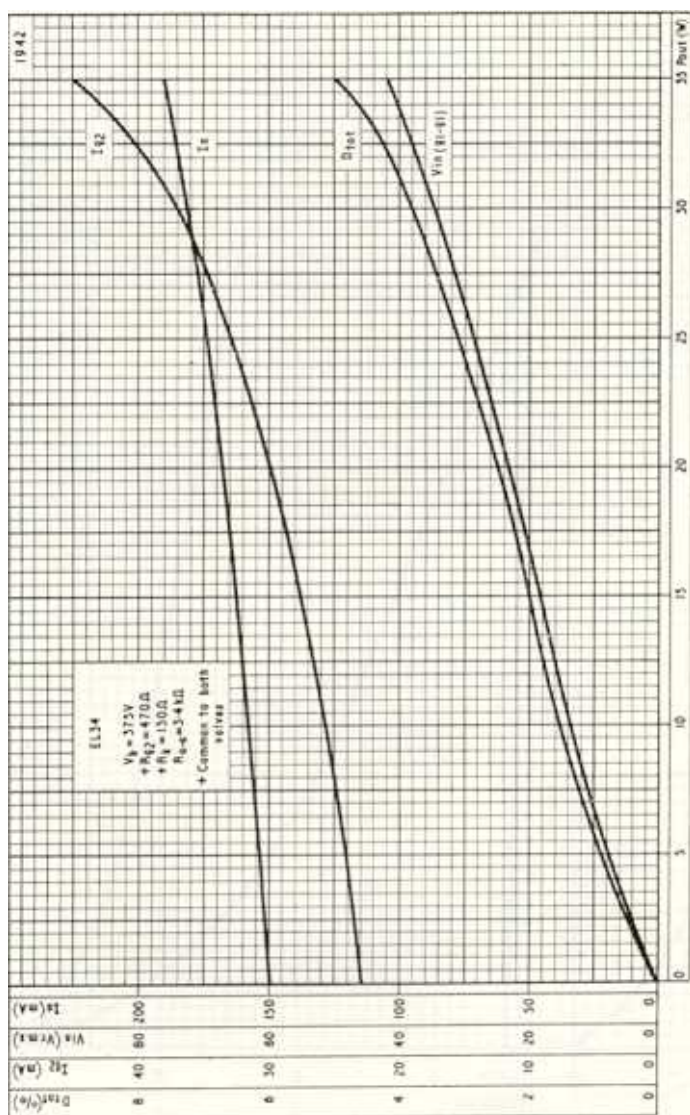


PERFORMANCE OF TWO EL34 IN PUSH-PULL WITH SEPARATE ANODE AND SCREEN-GRID VOLTAGE SUPPLIES AND FIXED BIAS $V_{a(b)}=800V$, $V_{g2(b)}=400V$

OUTPUT PENTODE

Output pentode rated for 25W anode dissipation, intended for use in a.c. mains operated equipment.

EL34

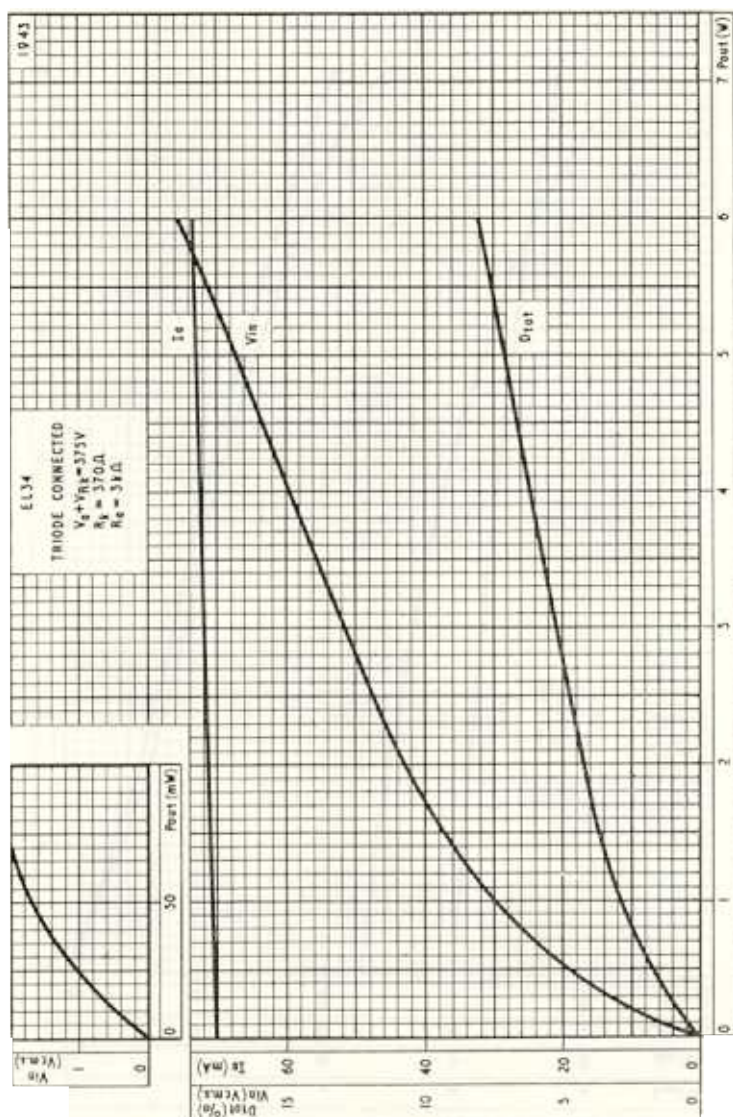


PERFORMANCE OF TWO EL34 IN PUSH-PULL WITH CATHODE BIAS AND $V_b=375V$

EL34

OUTPUT PENTODE

Output pentode rated for 25W anode dissipation, intended for use in a.c. mains operated equipment.

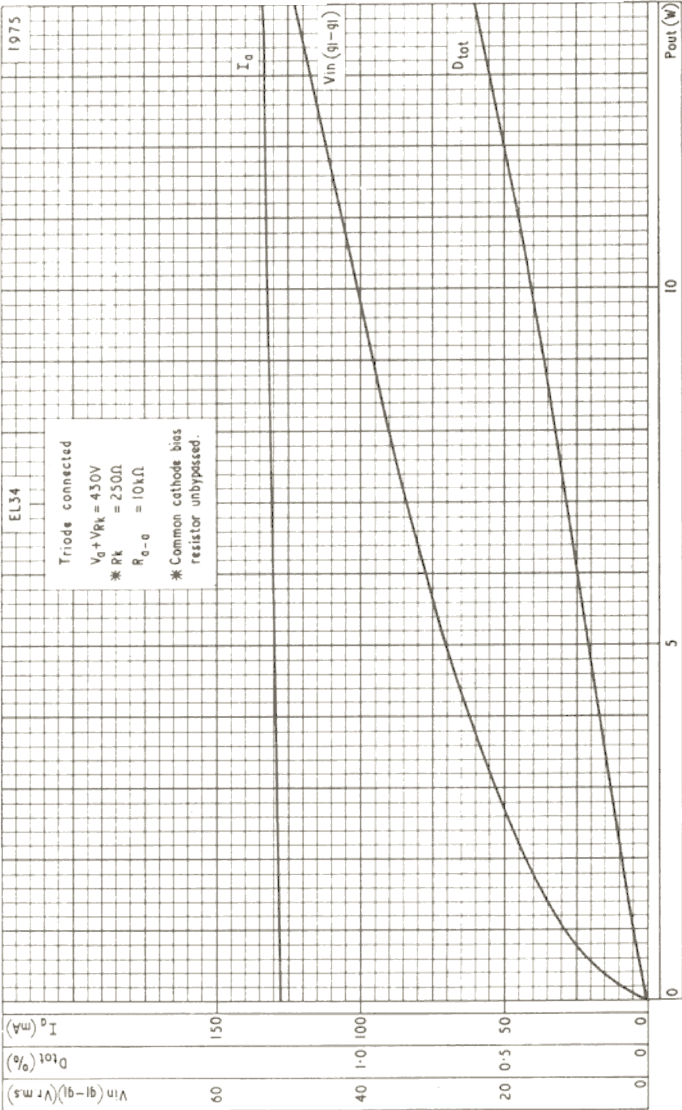


PERFORMANCE OF SINGLE EL34 TRIODE CONNECTED

OUTPUT PENTODE

EL34

Output pentode rated for 25W anode dissipation,
intended for use in a.c. mains operated equipment.



PERFORMANCE OF TWO EL34 IN PUSH-PULL TRIODE CONNECTED

