

OUTPUT PENTODE

EL34

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

HEATER

V_h	6.3	V
I_h	1.5	A

CAPACITANCES

C_{out}	8.4	pF
C_{in}	15.2	pF
C_{a-g1}	<1.0	pF
C_{g1-h}	<1.0	pF
C_{h-k}	11	pF

CHARACTERISTICS

Pentode connection

V_{g1}	250	V
V_{g2}	250	V
V_{g3}	0	V
I_a	100	mA
I_{g2}	15	mA
V_{g1}	-12.2	V
g_m	11	mA/V
r_a	15	k Ω
μ_{g1-g2}	11	
V_{g1} max. ($I_{g1} = +0.3I_a$)	-1.3	V

Triode connection (g_2 connected to a)

V_a	250	V
I_a	70	mA
V_{g1}	-15.5	V
g_m	11.5	mA/V
r_a	910	Ω
μ	10.5	

OPERATING CONDITIONS AS SINGLE VALVE CLASS "A" AMPLIFIER

Pentode connection

V_a	250	300	V
V_{g2}	250	300	V
V_{g3}	0	0	V
R_k	106	190	Ω
R_a	2.0	3.5	k Ω
I_a	100	83	mA
I_{g2}	15	13	mA
$V_{in(r.m.s.)}$ ($P_{out} = 50mW$)	500	450	mV
$V_{in(r.m.s.)}$	8.0	8.2	V
* P_{out}	11	11	W
* D_{tot}	10	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 a reduction in power output of approximately 10%.

OPERATING CONDITIONS FOR TWO VALVES IN PUSH-PULL

Distributed load conditions for maximum output (screen-grid tapping at 20% of primary turns)

V_b		450	V
R_{g2} (per valve)		1.0	k Ω
R_k (per valve)		500	Ω
R_{a-a}		7.0	k Ω
$I_{a(o)}$		2 x 55	mA ←
$I_{g2(o)}$		2 x 9.0	mA ←
$V_{in(g1-g1)r.m.s.}$		55.2	V
P_{out}		40	W
D_{tot}		4.5	%
I_a (max. sig.)		2 x 74	mA
I_{g2} (max. sig.)		2 x 9.0	mA

Distributed load conditions for minimum distortion (with screen-grid tapping at 43% of primary turns)

V_b	430	430	V
R_{g2} (per valve)	1.0	1.0	k Ω
R_k (per valve)	470	470	Ω
R_{a-a}	6.0	6.0	k Ω
$I_{a(o)}$	2 x 62.5	2 x 62.5	mA
$I_{g2(o)}$	2 x 10	2 x 10	mA
$V_{in(g1-g1)r.m.s.}$	35	50	V
P_{out}	20	34	W
D_{tot}	0.35	2.5	%
I_a (max. sig.)	2 x 65	2 x 70	mA
I_{g2} (max. sig.)	2 x 10.2	2 x 14	mA

OPERATING CONDITIONS FOR TWO VALVES IN PUSH-PULL

Fixed bias

V_b	375	400	V
V_{g3}	0	0	V
* R_{g2}	600	800	Ω
V_{g1}	-33	-36	V
R_{a-a}	3.5	3.5	k Ω
$I_{a(o)}$	2 x 30	2 x 30	mA
$I_{g2(o)}$	2 x 4.7	2 x 4.5	mA
$V_{in(g1-g1)r.m.s.}$	46.7	50	V
P_{out}	48	54	W
D_{tot}	2.8	1.6	%
I_a (max. sig.)	2 x 107.5	2 x 110.5	mA
I_{g2} (max. sig.)	2 x 23.5	2 x 23	mA

*Screen-grid resistor common to both valves.

Cathode bias

V_b	375	450	V
V_{g3}	0	0	V
* R_{g2}	0.47	1.0	k Ω
R_k (per valve)	260	465	Ω
R_{a-a}	3.5	6.5	k Ω
$I_{a(o)}$	2×75	2×60	mA
$I_{g2(o)}$	2×12.5	2×10	mA
$V_{in(g1-g1)r.m.s.}$	40	54	V
P_{out}	35	40	W
D_{tot}	1.7	5.1	%
$I_a(max. sig.)$	2×94	2×71.5	mA
$I_{g2(max. sig.)}$	2×19.5	2×22	mA

*Screen-grid resistor common to both valves.

OPERATING CONDITIONS FOR TWO VALVES IN PUSH-PULL

Triode connection (g_2 connected to a, g_3 to k) with separate cathode bias resistors.

With R_k bypassed

V_b	430	V
V_a	400	V
V_{g3}	0	V
R_k (per valve)	440	Ω
R_{a-a}	5.0	k Ω
$I_{a(o)}$	2×70	mA
$V_{in(g1-g1)r.m.s.}$	48	V
P_{out}	19	W
D_{tot}	1.8	%
$I_a(max. sig.)$	2×75	mA

With R_k unbypassed

V_b	430	V
V_a	400	V
V_{g3}	0	V
R_k (per valve)	440	Ω
R_{a-a}	10	k Ω
$I_{a(o)}$	2×70	mA
$V_{in(g1-g1)r.m.s.}$	48	V
P_{out}	14	W
D_{tot}	0.4	%
$I_a(max. sig.)$	2×73	mA

OPERATING CONDITIONS FOR TWO VALVES IN PUSH-PULL WITH CONTINUOUS SINE WAVE DRIVE

Fixed bias

V_b	375	400	V
V_{g3}	0	0	V
R_{g2}	1.0	1.5	$k\Omega$
V_{g1}	-32	-35.5	V
R_{a-a}	3.5	3.5	$k\Omega$
$I_{a(o)}$	2×30	2×30	mA
$I_{g2(o)}$	2×4.4	2×4.4	mA
$V_{in(g1-g1)r.m.s.}$	45	50	V
P_{out}	42	51	W
D_{tot}	3.0	1.8	%
$I_a(max. sig.)$	2×98	2×106	mA
$I_{g2(max. sig.)}$	2×19	2×21	mA

Cathode bias

Any of the cathode bias conditions published in this data sheet are suitable for continuous sine wave drive.

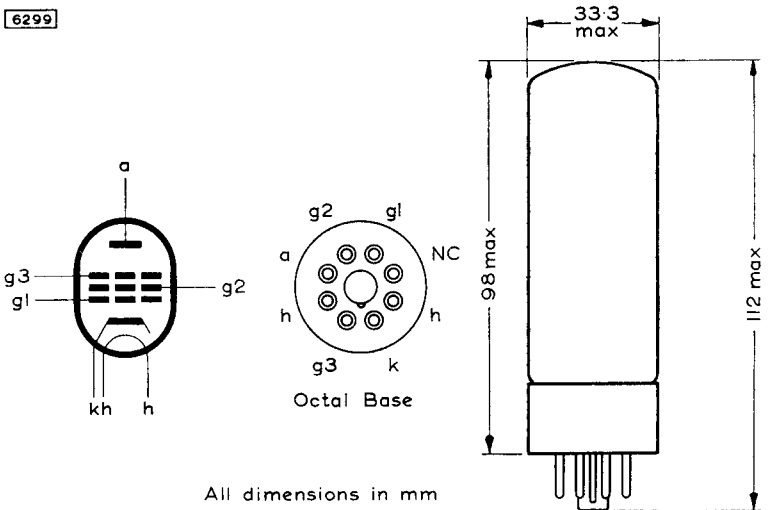
DESIGN CENTRE RATINGS

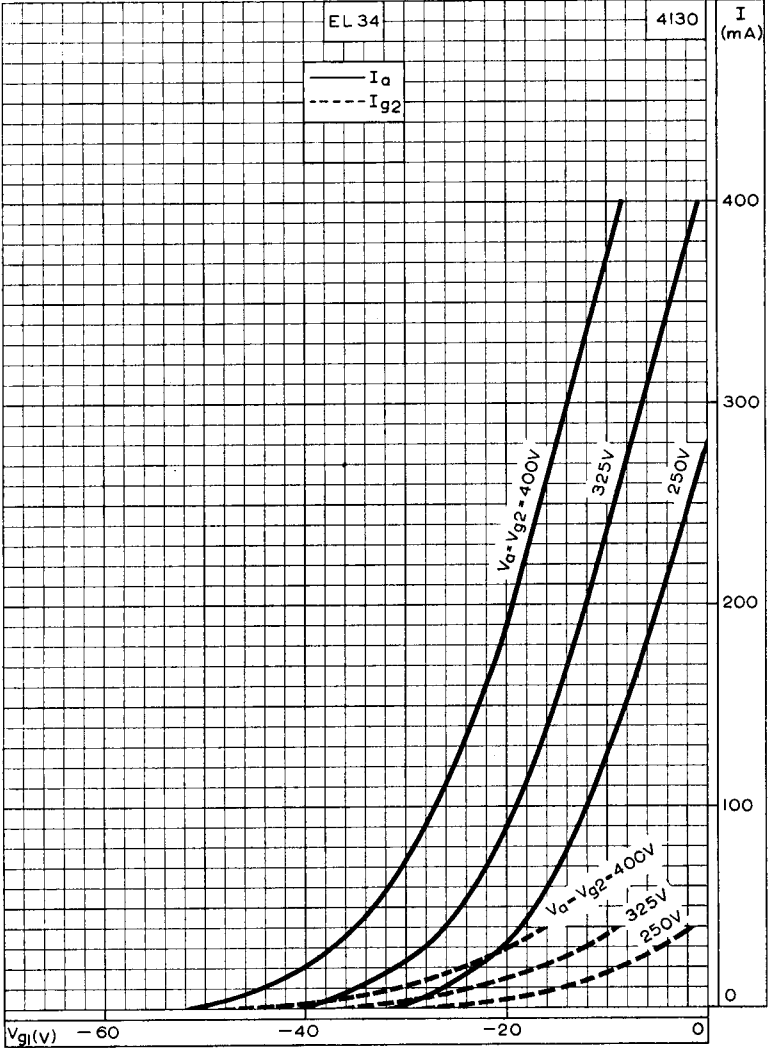
$V_{a(b)} max.$	2.0	kV
$V_a max.$	800	V
$p_a max.$	25	W
$V_{g2(b)} max.$	800	V
$V_{g2} max.$	500	V
$p_{g2} max.$	8.0	W
$I_k max.$	150	mA
$R_{g1-k} max.$	500	$k\Omega$
$V_{h-k} max.$	100	V
$R_{h-k} max.$	20	$k\Omega$

Triode connected

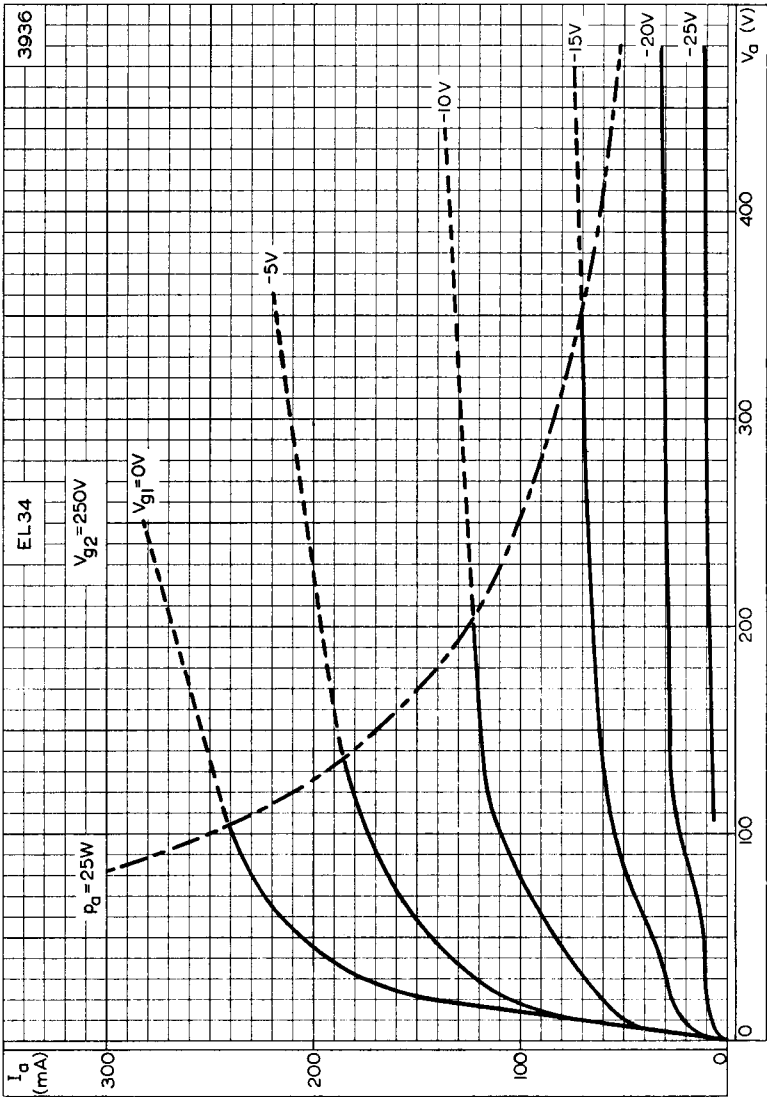
$V_a max.$	600	V
$p_{a+g2} max. (V_a = 500V)$	30	W
$p_{a+g2} max. (V_a = 600V)$	15	W

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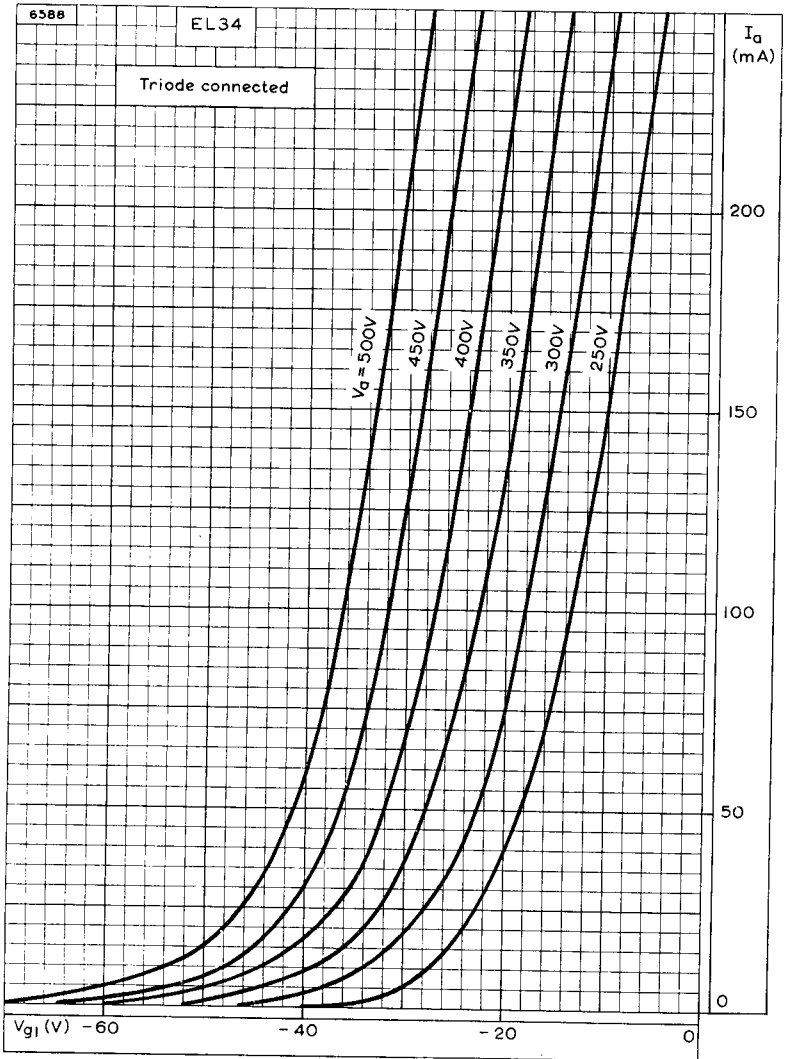




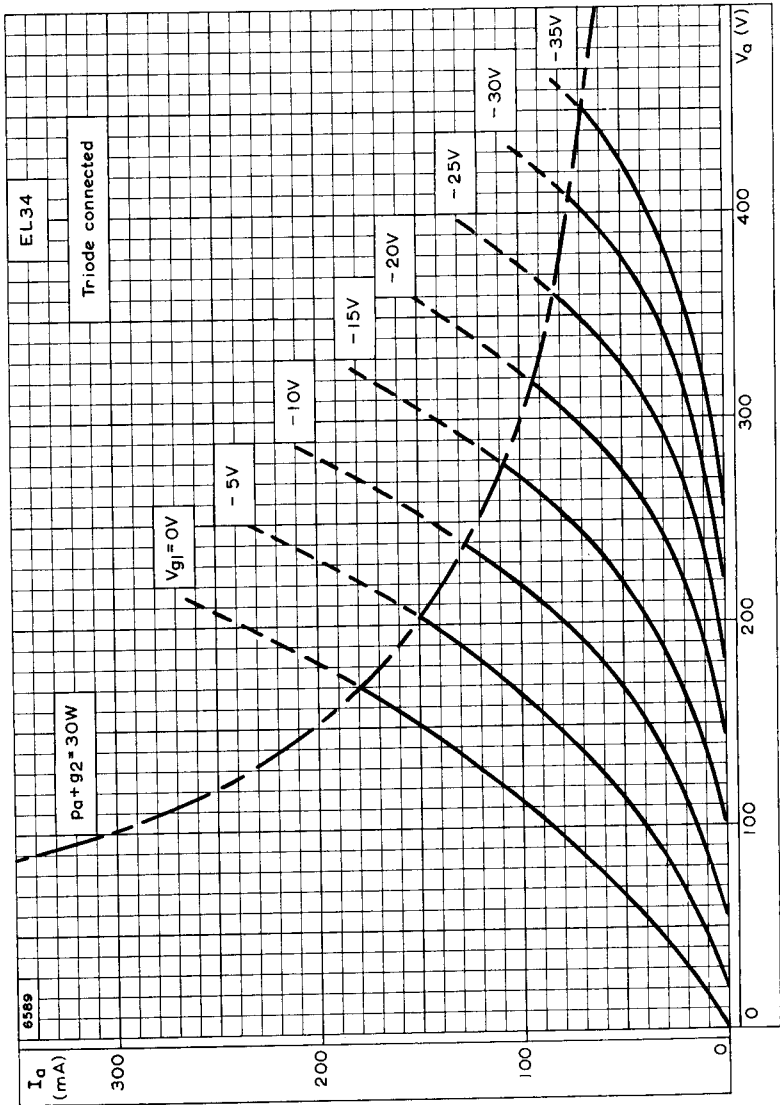
ANODE AND SCREEN-GRID CURRENTS PLOTTED AGAINST CONTROL-GRID VOLTAGE WITH ANODE AND SCREEN-GRID VOLTAGES AS PARAMETERS



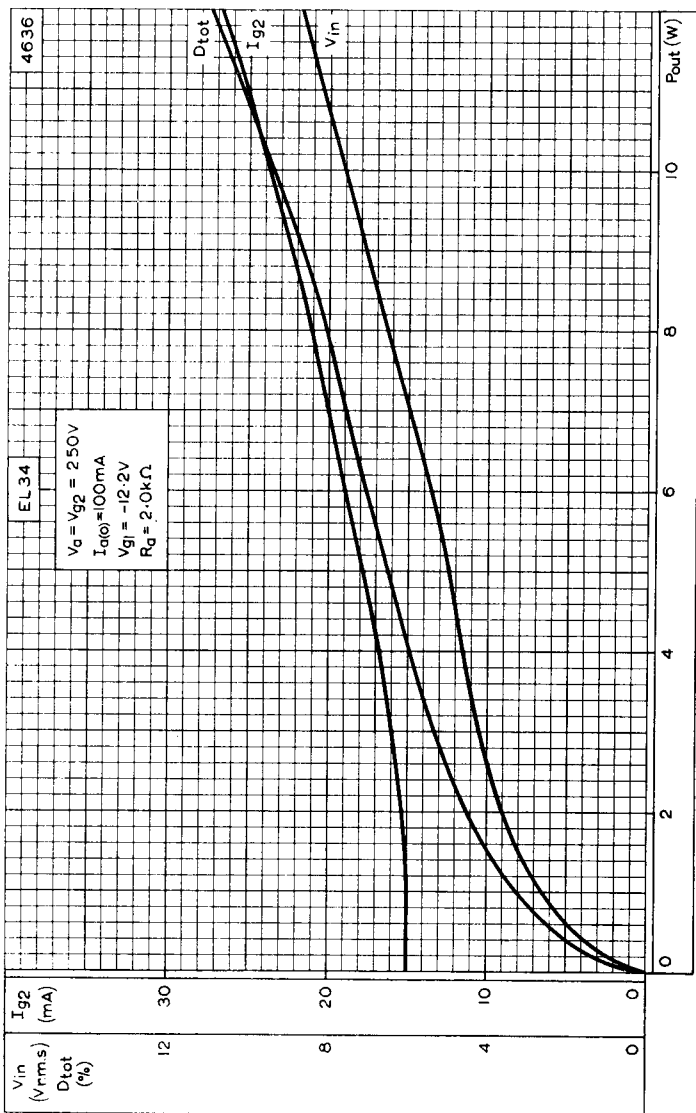
ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER



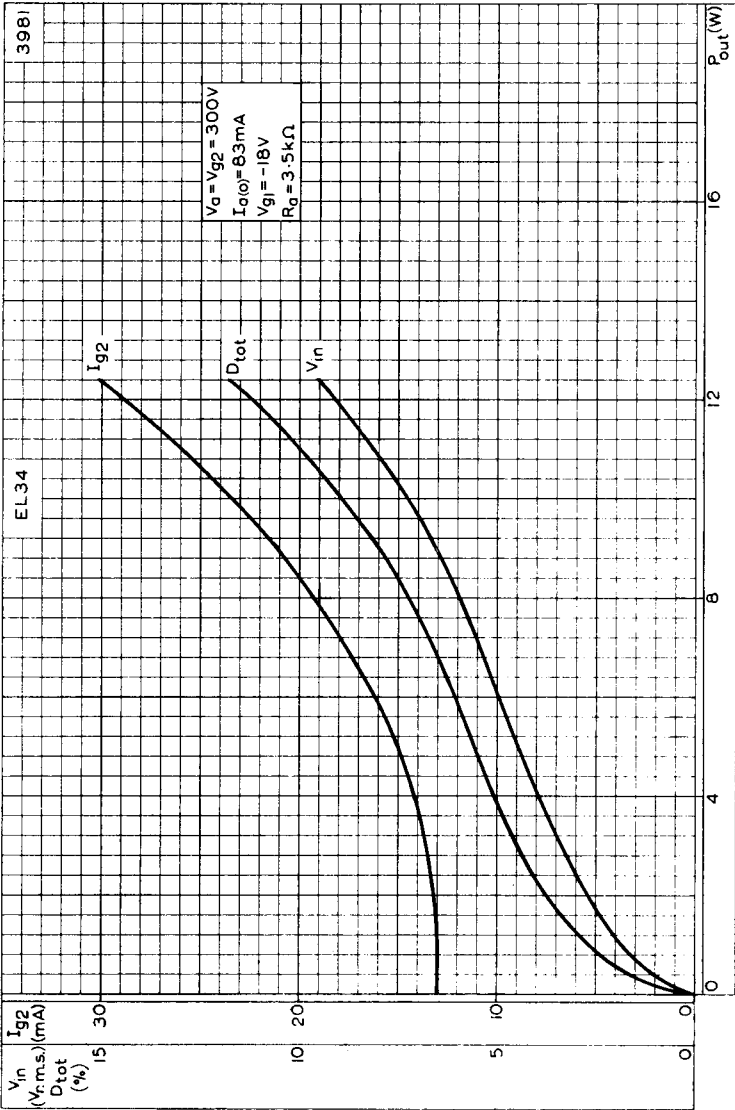
ANODE CURRENT PLOTTED AGAINST CONTROL-GRID VOLTAGE WITH ANODE VOLTAGE AS PARAMETER WHEN TRIODE CONNECTED



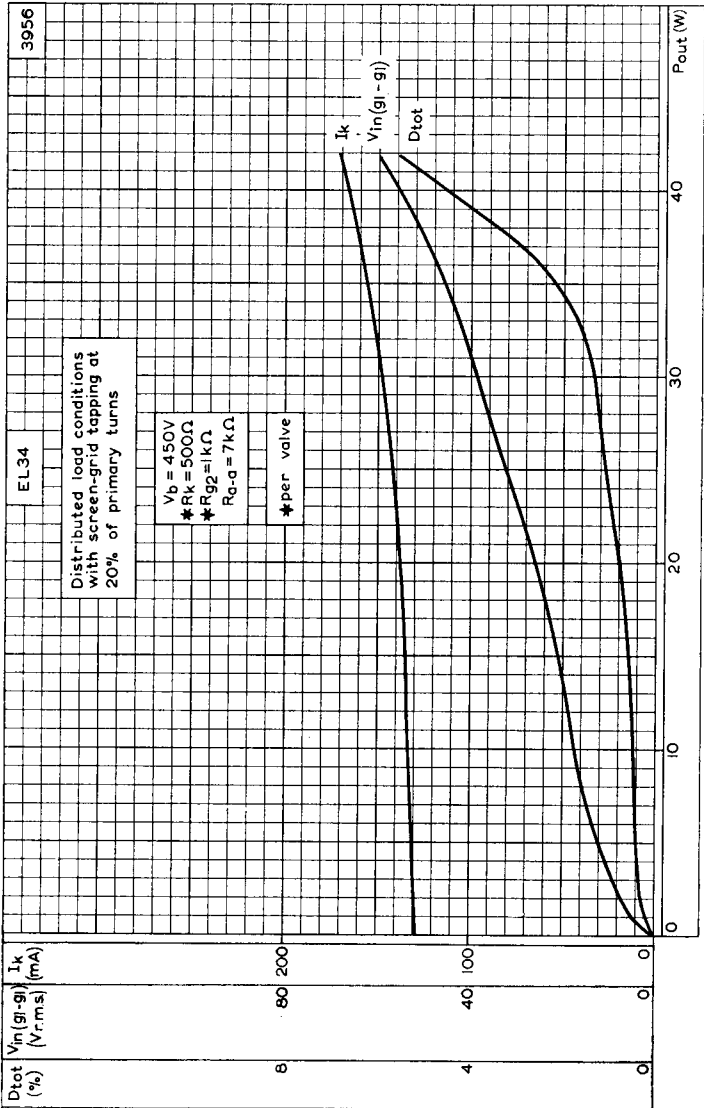
ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER WHEN TRIODE CONNECTED



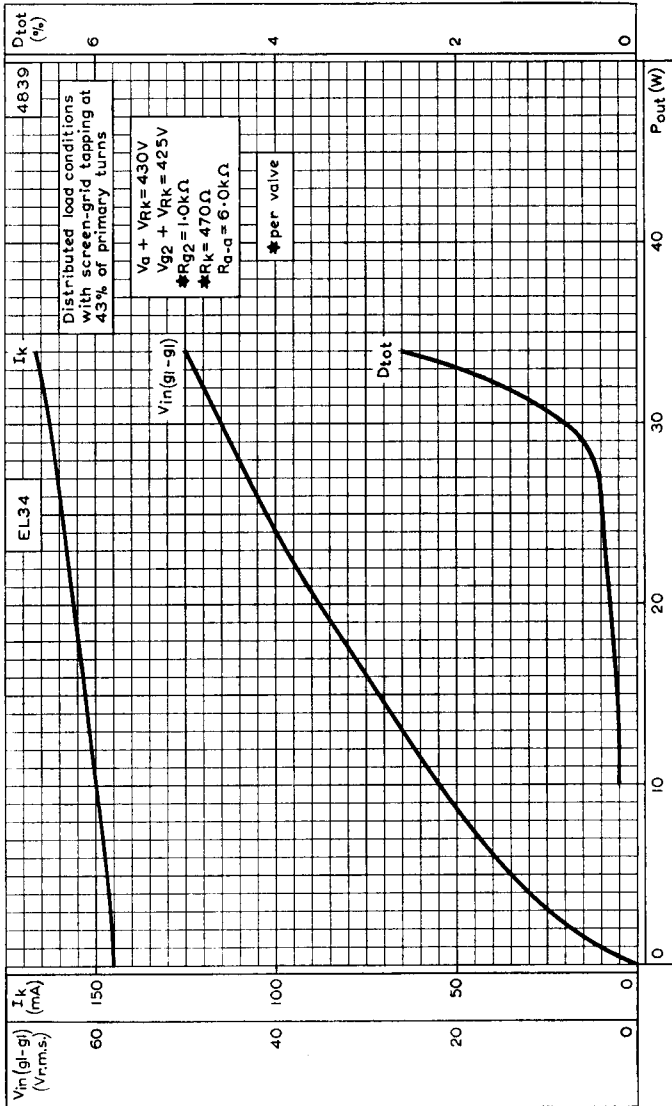
PERFORMANCE OF EL34 WHEN USED AS A SINGLE VALVE CLASS 'A' AMPLIFIER. $V_d = 250V$



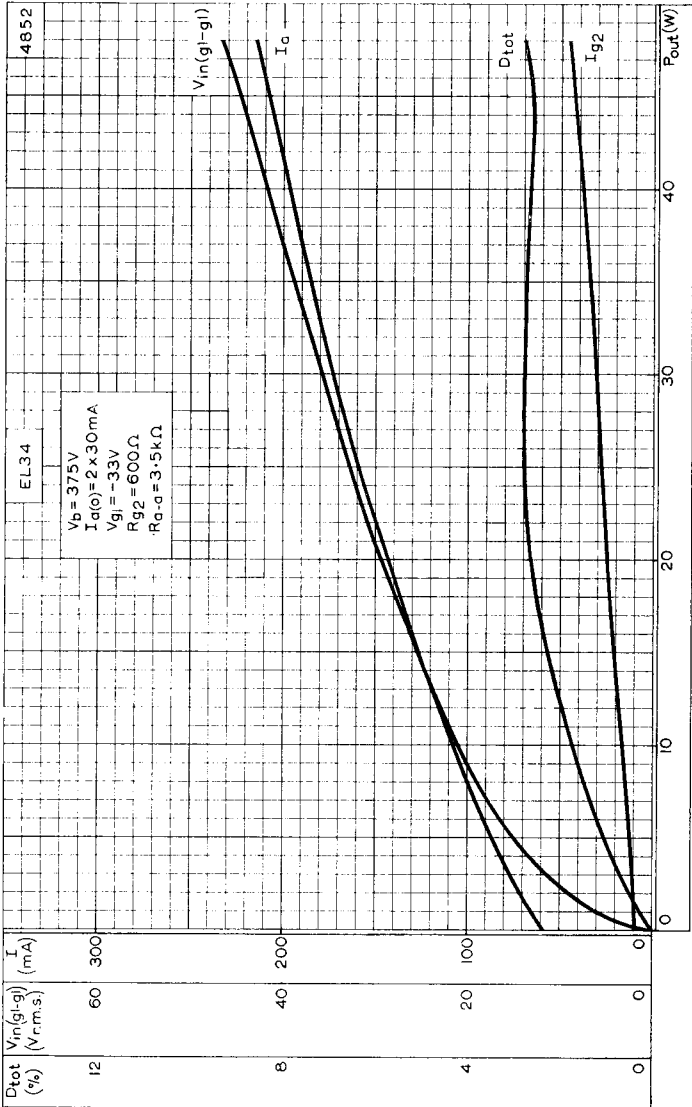
PERFORMANCE OF EL34 WHEN USED AS A SINGLE VALVE CLASS 'A' AMPLIFIER. $V_{G1} = 300V$



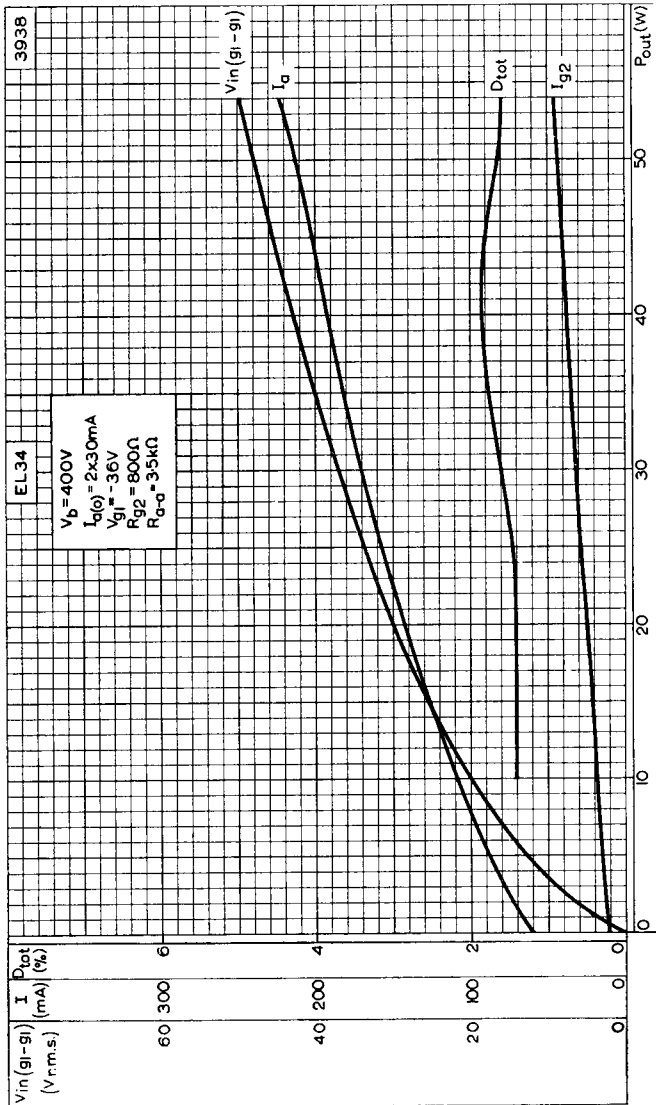
PERFORMANCE OF TWO EL34 IN PUSH-PULL WITH DISTRIBUTED LOAD CONDITIONS. SCREEN-GRID TAPPING AT 20% OF PRIMARY TURNS



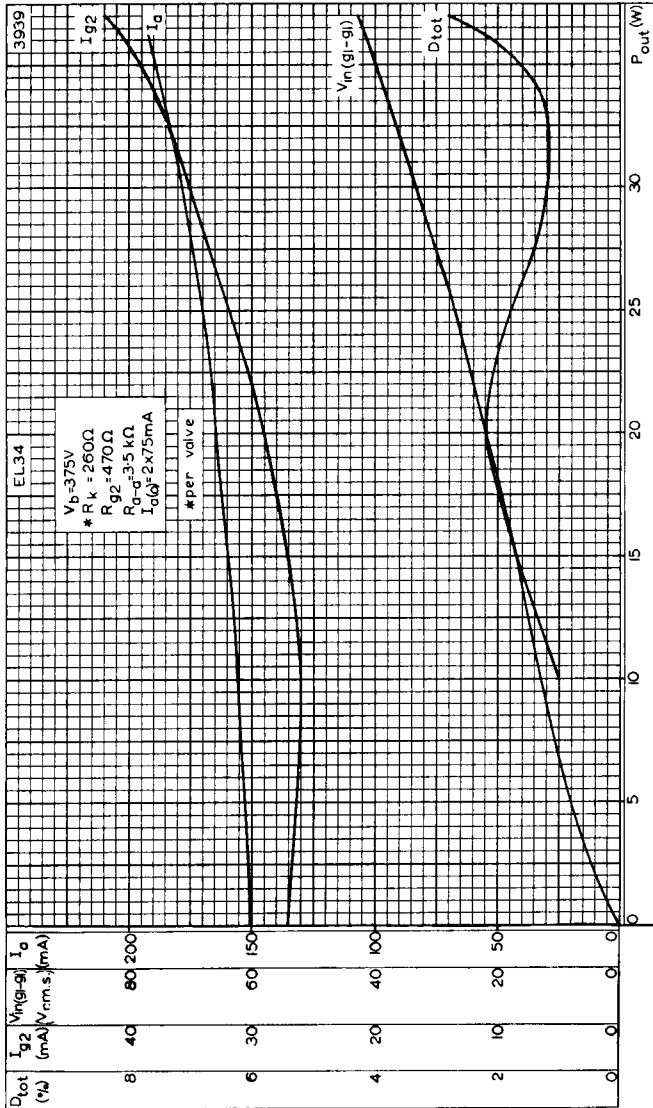
PERFORMANCE OF TWO EL34 IN PUSH-PULL WITH DISTRIBUTED LOAD CONDITIONS. SCREEN-GRID TAPPING AT 43% OF PRIMARY TURNS



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

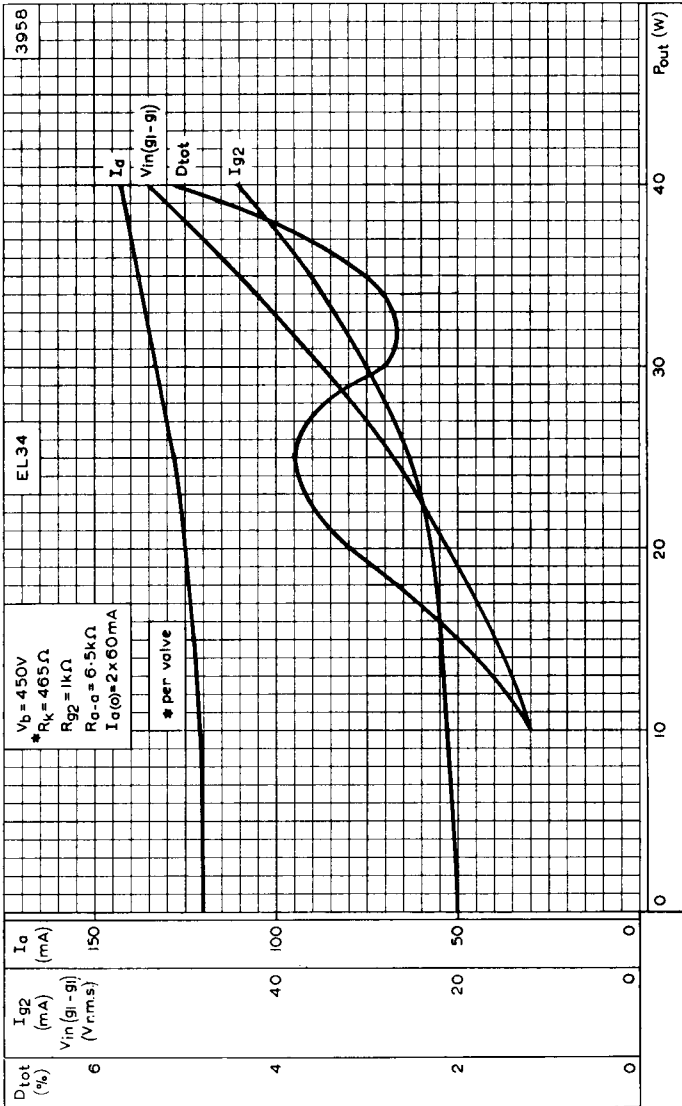


PERFORMANCE OF TWO EL34 IN PUSH-PULL WITH FIXED BIAS
 $V_b = 400V$

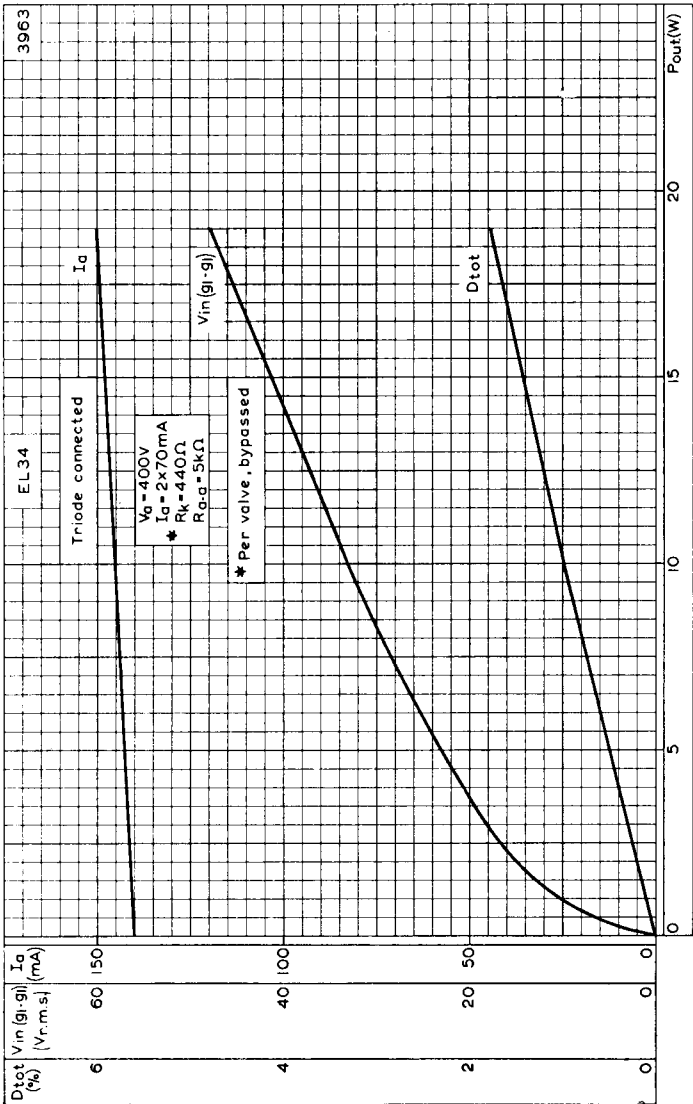


PERFORMANCE OF TWO EL34 IN PUSH-PULL WITH CATHODE BIAS
 $V_b = 375V$

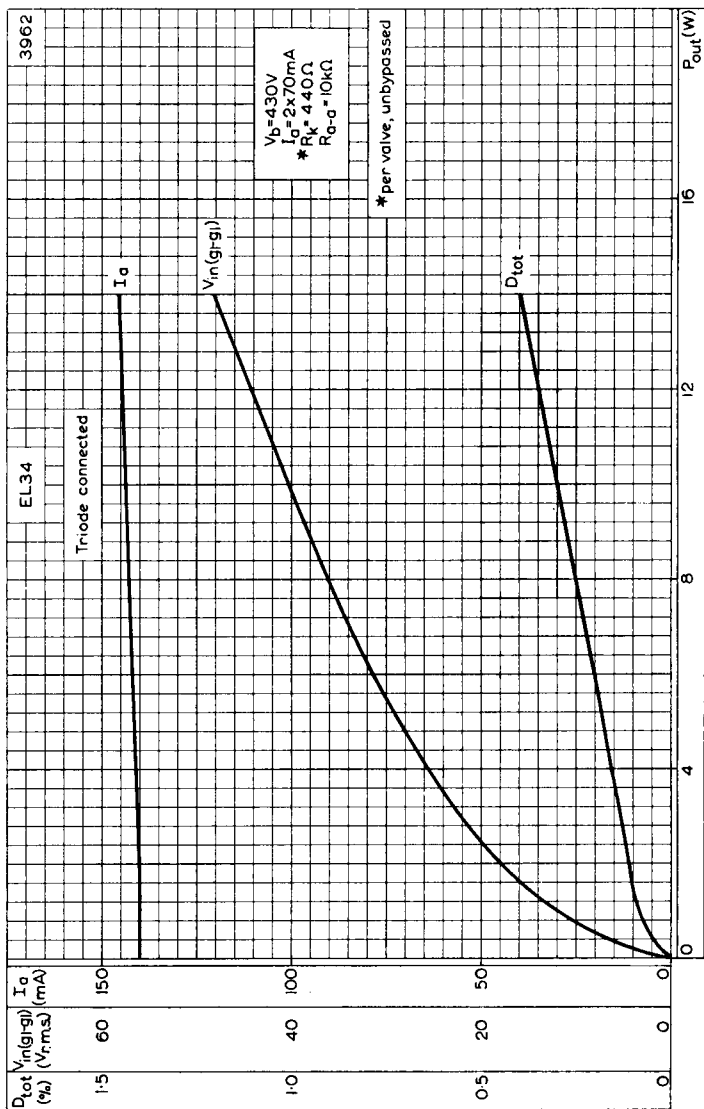




PERFORMANCE OF TWO EL34 IN PUSH-PULL WITH CATHODE BIAS
 $V_b = 450V$



PERFORMANCE OF TWO EL34 IN PUSH-PULL WHEN TRIODE CONNECTED AND THE CATHODE BYPASSED



PERFORMANCE OF TWO EL34 IN PUSH-PULL WHEN TRIODE CONNECTED AND THE CATHODE UNBYPASSED