SUBMINIATURE V.H.F. OUTPUT PENTODE

DL70

Subminiature output pentode suitable for v.h.f. applications in battery-operated equipment.

This valve is primarily intended for use in communications equipment of the 'push to talk' type and its continuous life rating under typical supply voltage conditions is relatively short and is chiefly a function of hours of filament operation and filament temperature.

Under 'push to talk' conditions an operating life of about 200 hours may be expected.

FILAMENT

Suitable for d.c. operation only.

V_f	1.25	V
I_f	110	mA

MOUNTING POSITION

Any

Note – Direct soldered connections to the leads of this valve must be at least 5mm from the seal and any bending of the valve leads must be at least 1.5mm from the seal.

If the valve is used with an earthed metal clip a decrease in output power of approximately 10% can be expected up to 200Mc/s.

CAPACITANCES

	Shielded	Unshielded	
C_{a-g1}	<0.1	0.08	pF
C_{in}	3.0	3.1	pF
C_{out}	5.6	3.9	pF

CHARACTERISTICS

V_a	135	V
V_{g2}	90	V
I_a	7.5	mA
I_{g2}	1.5	mA
V_{g1}	–7.5	V
g_m	1.9	mA/V
r_a	150	kΩ
μ_{g1-g2}	6.5	

OPERATING CONDITIONS AS A CLASS 'C' TELEGRAPHY R.F. OSCILLATOR

f	10	50	Mc/s
V_a	150	150	V
V_{g2}	110	110	V
I_a	10	10	mA
I_{g2}	3.0	3.0	mA
I_{g1}	40	40	μA
R_{g1}	470	390	kΩ
P_{load}	800	800	mW
η_{load}	53	53	%
$v_{a(pk)}$	120	—	V
$v_{g1(pk)}$	23	—	V

DL70

SUBMINIATURE V.H.F. OUTPUT PENTODE

Subminiature output pentode suitable for v.h.f. applications in battery-operated equipment.

OPERATING CONDITIONS AS A CLASS 'C' TELEGRAPHY R.F. AMPLIFIER

f	50	200	Mc/s
V_a	150	150	V
V_{g2}	110	110	V
V_{g1}	−22	−22	V
I_a	9.7	10.5	mA
I_{g2}	3.2	2.5	mA
I_{g1}	80	60	μA
P_{load}	820	450	mW
η_{load}	56	29	%

P_{drive} measured at the control-grid is approximately 50mW at f=200Mc/s and does not include the power lost in the grid tuned circuit.

OPERATING CONDITIONS AS A FREQUENCY MULTIPLIER

Doubler

f_{out}	50	50	100	100	Mc/s
V_a	90	150	90	150	V
V_{g2}	90	110	90	110	V
V_{g1}	−32	−40	−32	−40	V
I_a	4.3*	9.4	4.7*	9.9	mA
I_{g2}	1.5	3.4	1.3	3.0	mA
I_{g1}	13	140	8.0	90	μA
P_{load}	180	590	150	510	mW
η_{load}	47	42	36	34	%

Trebler

f_{out}	50	50	100	100	Mc/s
V_a	90	150	90	150	V
V_{g2}	90	110	90	110	V
V_{g1}	−60	−70	−60	−70	V
I_a	4.4*	9.3	4.6*	9.7	mA
I_{g2}	1.6	3.4	1.4	3.1	mA
I_{g1}	30	24	24	190	μA
P_{load}	140	420	120	360	mW
η_{load}	35	30	29	25	%

Quadrupler

f_{out}	50	50	Mc/s
V_a	90	150	V
V_{g2}	90	110	V
V_{g1}	−65	−80	V
I_a	4.5*	6.2	mA
I_{g2}	1.5	1.8	mA
I_{g1}	32	27	μA
P_{load}	100	220	mW
η_{load}	25	24	%

*For class 'C' r.f. operation at $V_a \leq 90V$, I_k max. = 6.0mA.

SUBMINIATURE V.H.F. OUTPUT PENTODE

DL70

Subminiature output pentode suitable for v.h.f. applications in battery-operated equipment.

OPERATING CONDITIONS AS SINGLE VALVE CLASS 'A' AMPLIFIER

V_a	45	67.5	90	120	135	V
V_{g2}	45	67.5	90	120	90	V
V_{g1}	–2.9	–3.8	–6.5	–12	–7.5	V
I_a	3.0	7.5	9.0	8.0	7.5	mA
$I_{g2(o)}$	0.8	1.8	2.1	1.8	1.5	mA
I_{g2}(max. sig.)	1.2	2.7	3.1	3.0	2.5	mA
R_a	12	6.5	7.0	13	16	kΩ
$V_{in(r.m.s.)}$ (P_{out}=50mW)	1.9	1.5	1.5	1.3	1.1	V
P_{out}	58	190	360	460	500	mW
$V_{in(r.m.s.)}$	2.2	3.4	4.7	4.7	4.0	V
D_{tot}	10	10	10	10	10	%

OPERATING CONDITIONS FOR TWO VALVES IN CLASS 'AB' PUSH-PULL

V_{a-e}	90	150	V
V_{g2-e}	90	120	V
$I_{a(o)}$	2×6.5	2×6.3	mA
I_a(max. sig.)	2×7.6	2×7.95	mA
$I_{g2(o)}$	2×1.5	2×1.4	mA
I_{g2}(max. sig.)	2×2.6	2×2.65	mA
R_k	390	680	Ω
R_{a-a}	11	18	kΩ
$V_{in(g1-g1)r.m.s.}$(P_{out}=50mW)	2.8	4.2	V
P_{out}	0.65	1.35	W
$V_{in(g1-g1)r.m.s.}$	14.5	11.3	V
D_{tot}	5.7	4.7	%

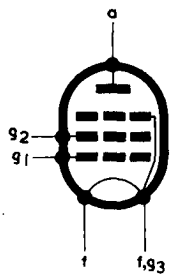
LIMITING VALUES

V_a max.	150	V
p_a max.	1.0	W
V_{g2} max.	150	V
p_{g2} max.	450	mW
R_{g1-f} max.	2.2	MΩ
V_f max. (absolute)	1.35	V
V_{g1} max.:—r.f. amplifier	–25	V
frequency doubler	–40	V
frequency trebler	–70	V
frequency quadrupler	–80	V
I_k max.:—	13	mA
frequency quadrupler ($V_a \geq 90V$)	8.0	mA

DL70

SUBMINIATURE V.H.F. OUTPUT PENTODE

Subminiature output pentode suitable for v.h.f. applications in battery-operated equipment.



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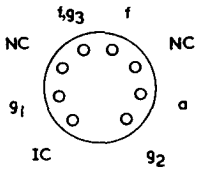
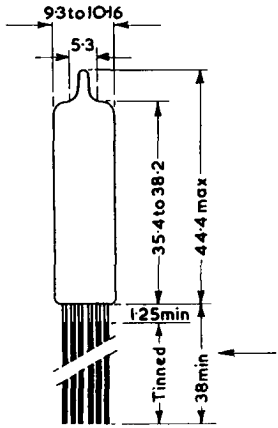


B8D/F Base

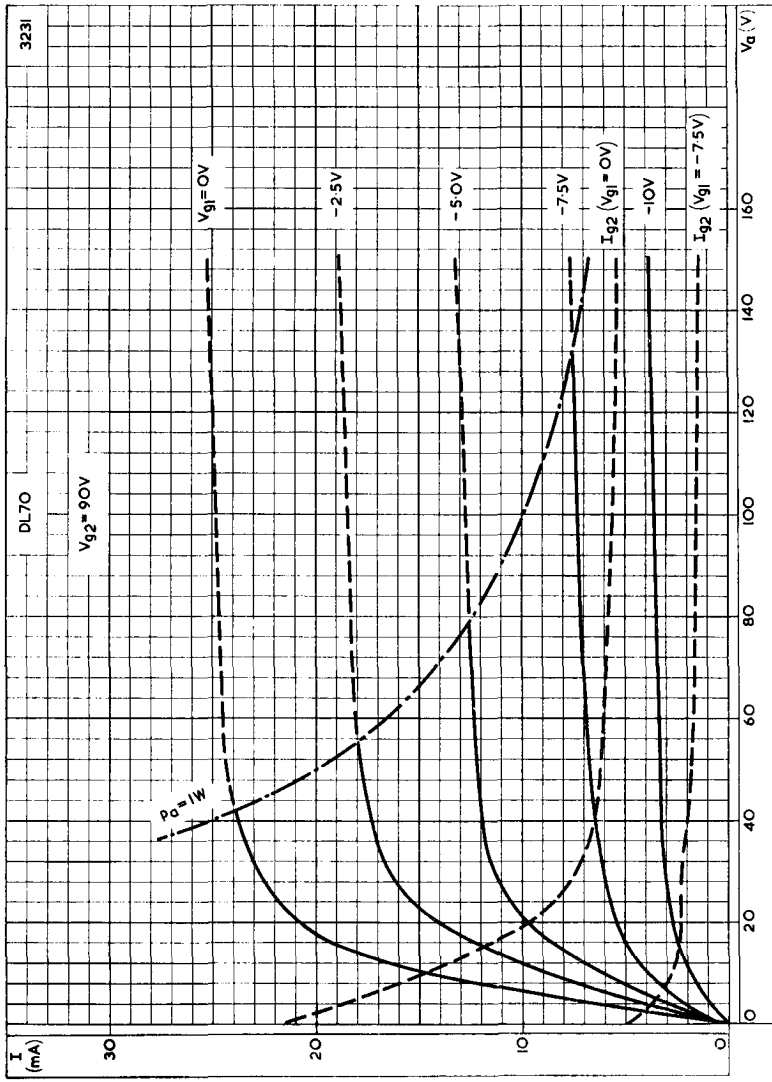
All dimensions in mm



SUBMINIATURE V.H.F. OUTPUT PENTODE

DL70

Subminiature output pentode suitable for v.h.f. applications in battery-operated equipment.

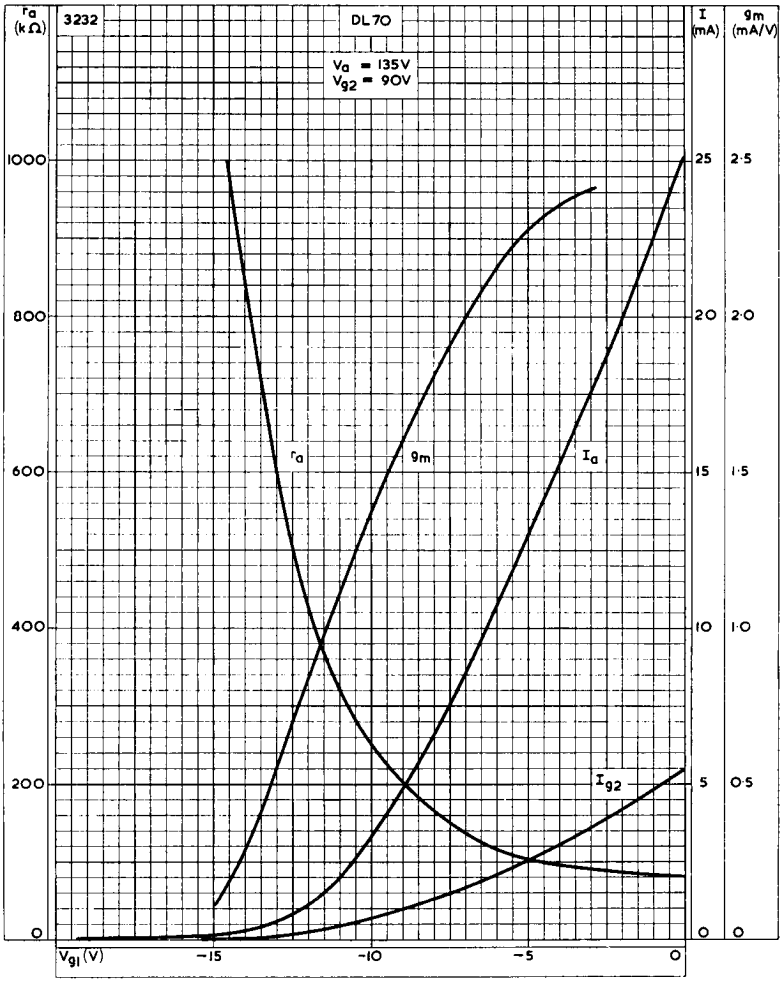


ANODE AND SCREEN-GRID CURRENTS PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER. V_{g2}=90V

DL70

SUBMINIATURE V.H.F. OUTPUT PENTODE

Subminiature output pentode suitable for v.h.f. applications in battery-operated equipment.



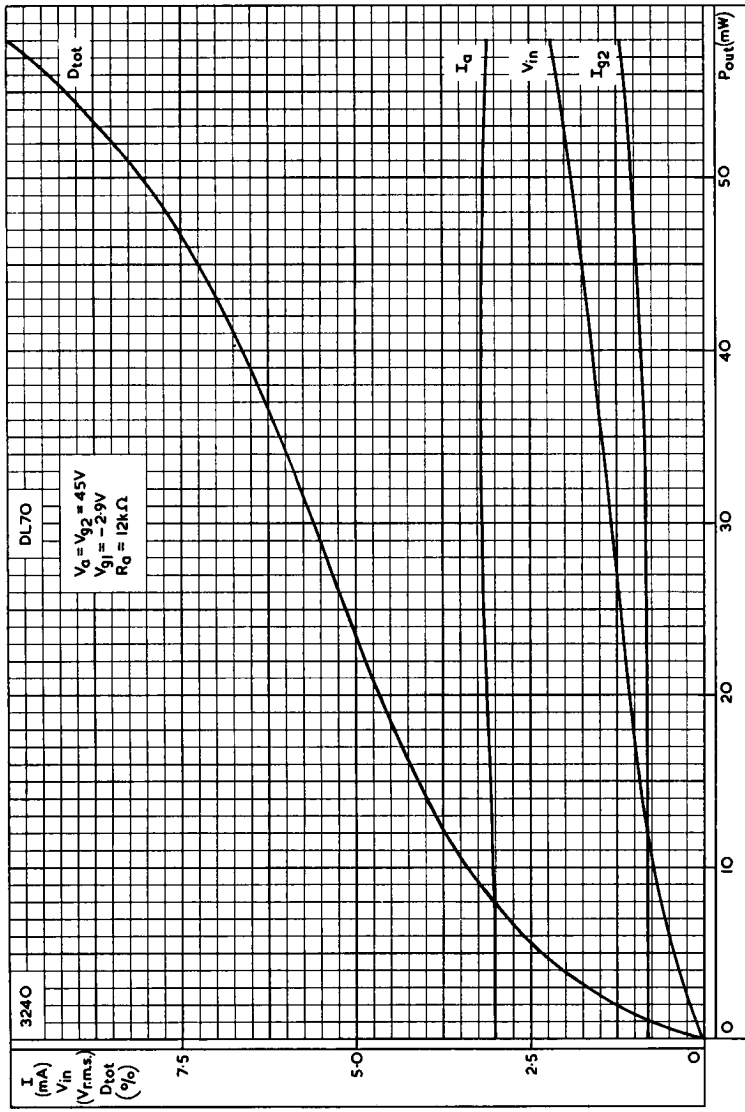
ANODE AND SCREEN-GRID CURRENTS, MUTUAL CONDUCTANCE AND ANODE IMPEDANCE PLOTTED AGAINST CONTROL-GRID VOLTAGE

$V_a = 135V$, $V_{g2} = 90V$

SUBMINIATURE V.H.F. OUTPUT PENTODE

DL70

Subminiature output pentode suitable for v.h.f. applications in battery-operated equipment.

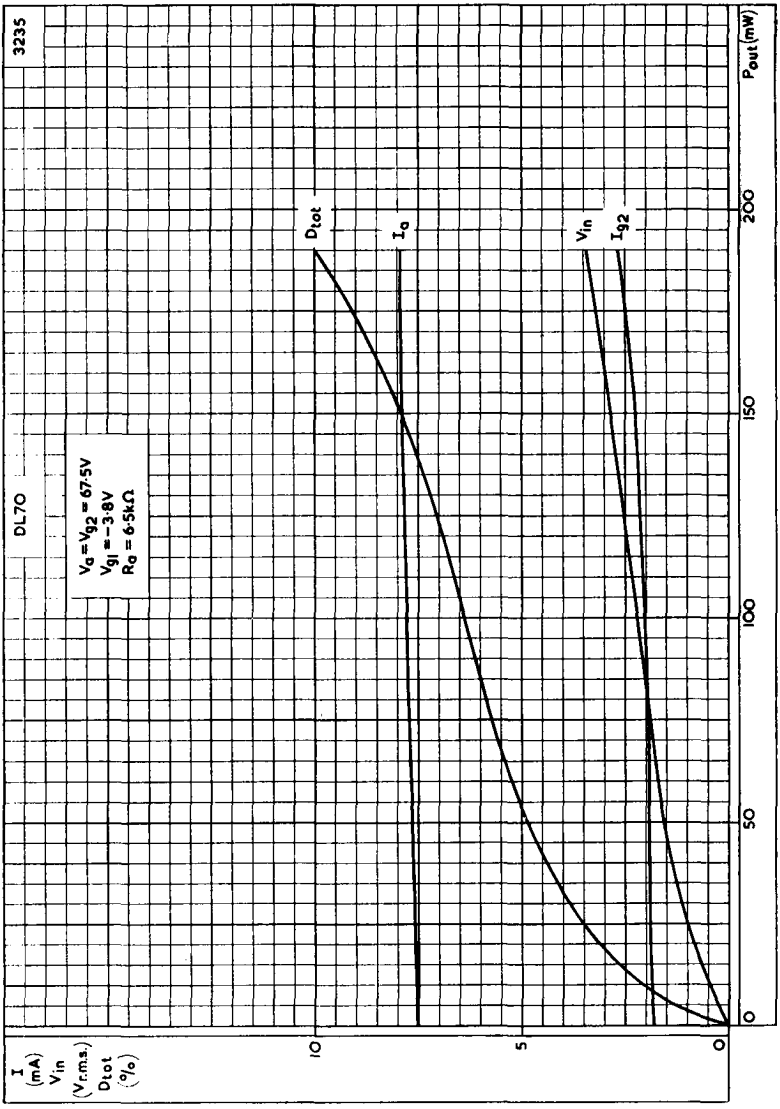


PERFORMANCE OF SINGLE DL70 AS CLASS 'A' AMPLIFIER. $V_a = V_{g2} = 45V$

DL70

SUBMINIATURE V.H.F. OUTPUT PENTODE

Subminiature output pentode suitable for v.h.f. applications in battery-operated equipment.

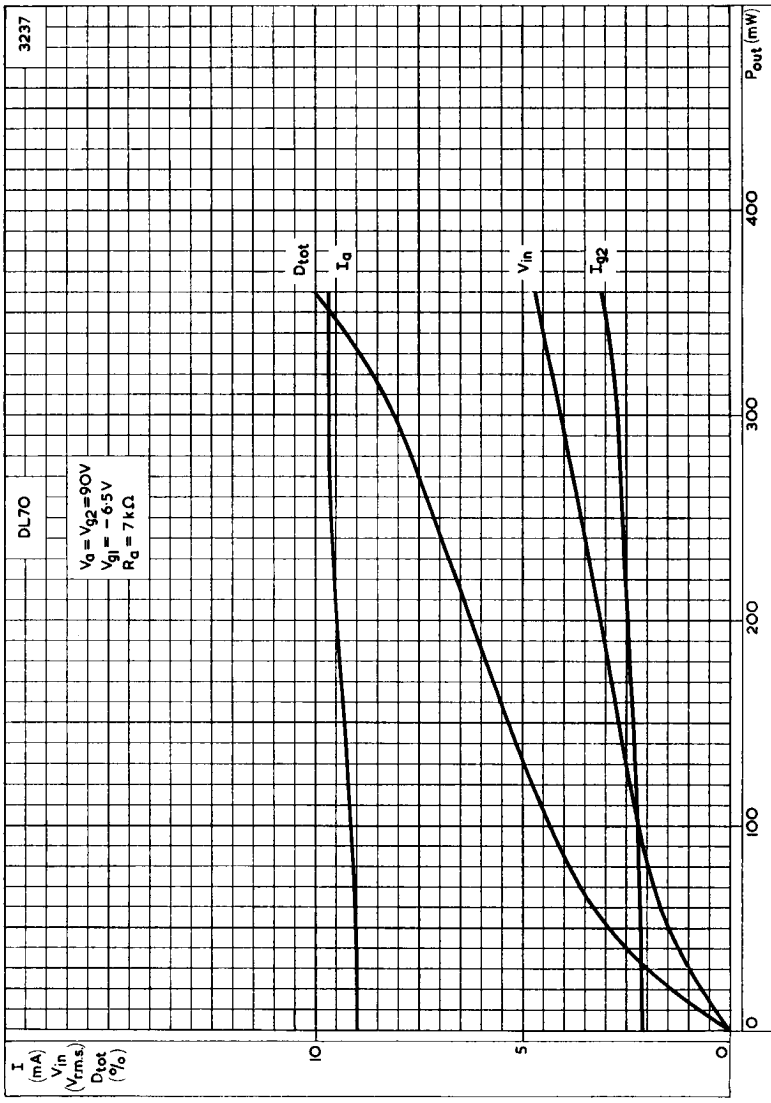


PERFORMANCE OF SINGLE DL70 AS CLASS 'A' AMPLIFIER. $V_a = V_{g2} = 67.5V$

SUBMINIATURE V.H.F. OUTPUT PENTODE

DL70

Subminiature output pentode suitable for v.h.f. applications in battery-operated equipment.

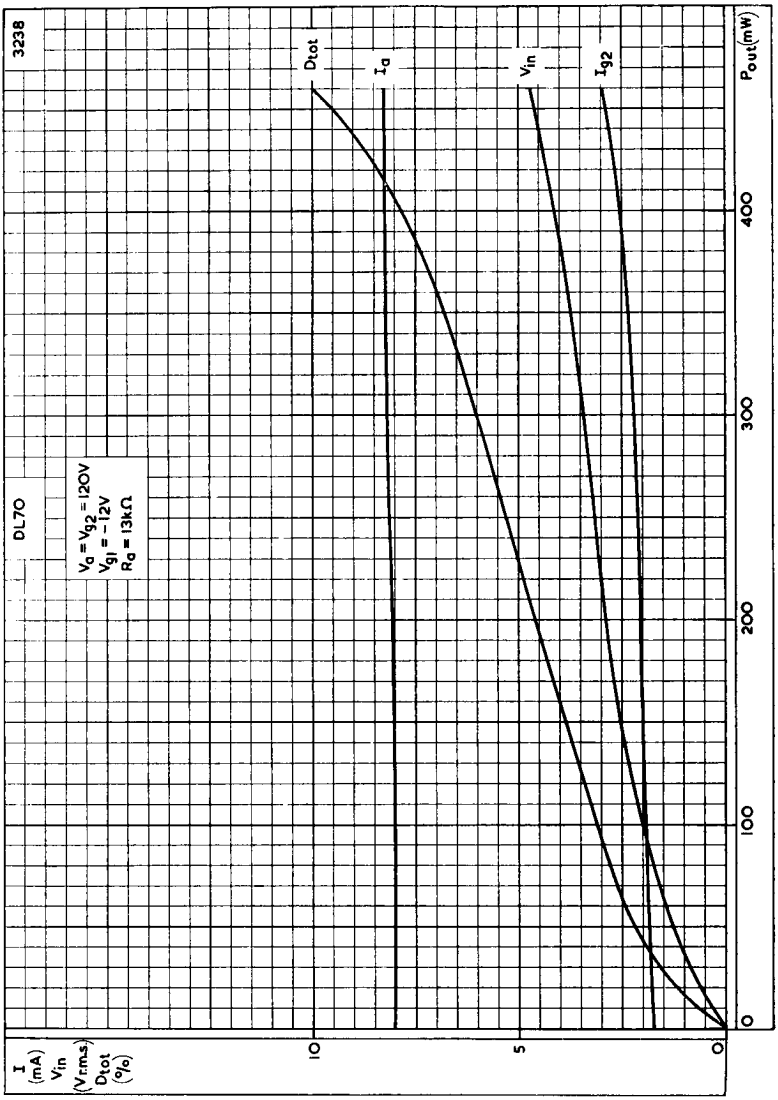


PERFORMANCE OF SINGLE DL70 AS CLASS 'A' AMPLIFIER. $V_a = V_{g2} = 90V$

DL70

SUBMINIATURE V.H.F. OUTPUT PENTODE

Subminiature output pentode suitable for v.h.f. applications in battery-operated equipment.

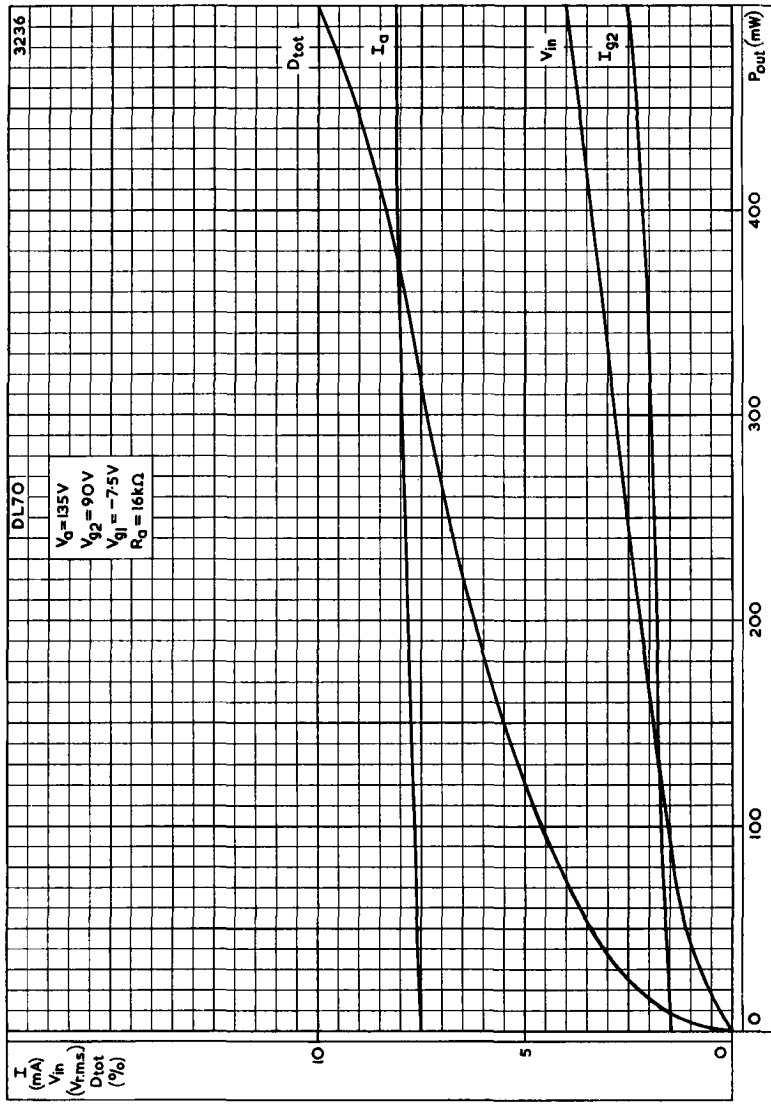


PERFORMANCE OF SINGLE DL70 AS CLASS 'A' AMPLIFIER. $V_a = V_{g2} = 120V$

SUBMINIATURE V.H.F. OUTPUT PENTODE

DL70

Subminiature output pentode suitable for v.h.f. applications in battery-operated equipment.

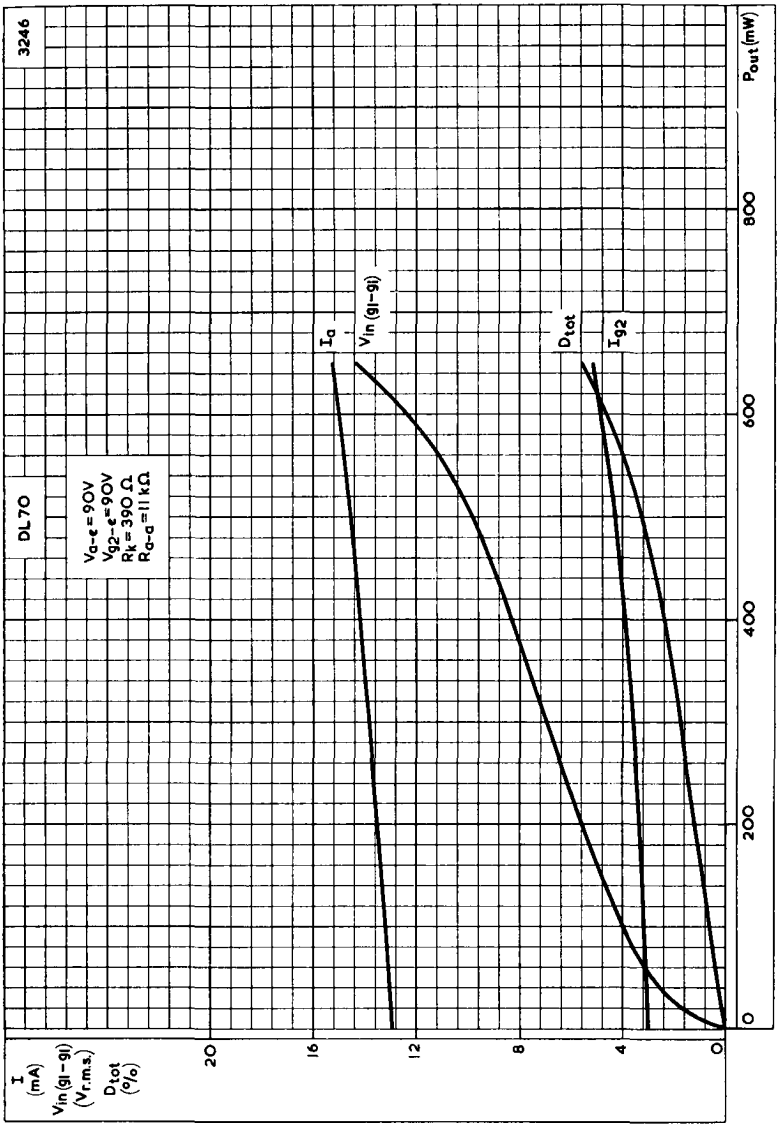


PERFORMANCE OF SINGLE DL70 AS CLASS 'A' AMPLIFIER. V_a=135V, V_{g2}=90V

DL70

SUBMINIATURE V.H.F. OUTPUT PENTODE

Subminiature output pentode suitable for v.h.f. applications in battery-operated equipment.



PERFORMANCE OF TWO DL70 IN CLASS 'AB' PUSH-PULL
$V_{a-e} = V_{g2-e} = 90V$

SUBMINIATURE V.H.F. OUTPUT PENTODE

DL70

Subminiature output pentode suitable for v.h.f. applications in battery-operated equipment.

PERFORMANCE OF TWO DL70 IN CLASS 'AB' PUSH-PULL
V_{a-e}=150V, V_{g2-e}=120V