



Twin Triode Type DET 19

(POWER AMPLIFIER, OSCILLATOR AND MULTIPLIER)

General. The DET 19 is a low-power transmitting valve, consisting of two triodes in one envelope, suitable for use as a power amplifier, oscillator or frequency multiplier, at frequencies up to 250 Mc/s. It is necessary to neutralise the valve under all conditions of amplifier service; two capacitors which may each have a maximum value of 5 pF, are required for each valve.

Cooling. The valve must be adequately ventilated as it becomes very hot under normal operating conditions. No visible heating of the anodes should occur under any condition of operation.

APPROXIMATE DATA

V_h	6.3	V
I_h	0.8	A
$V_{a(max)}$	300	V
$I_{a(max)}$ per anode	40	mA
$P_{a(max)}$ per anode	5	W
g_m	taken at	2.1 mA/V
μ	V_a 300 V	7
r_a	I_a 25 mA	3,340 Ω
$V_{h-k(max)}$	100	V
$C_{a'-a''}$	1	pF
C_{a-gl} (other electrodes earthed)	2.3	pF
C_{a-k}	0.6	pF
C_{gl-k}	4.2	pF

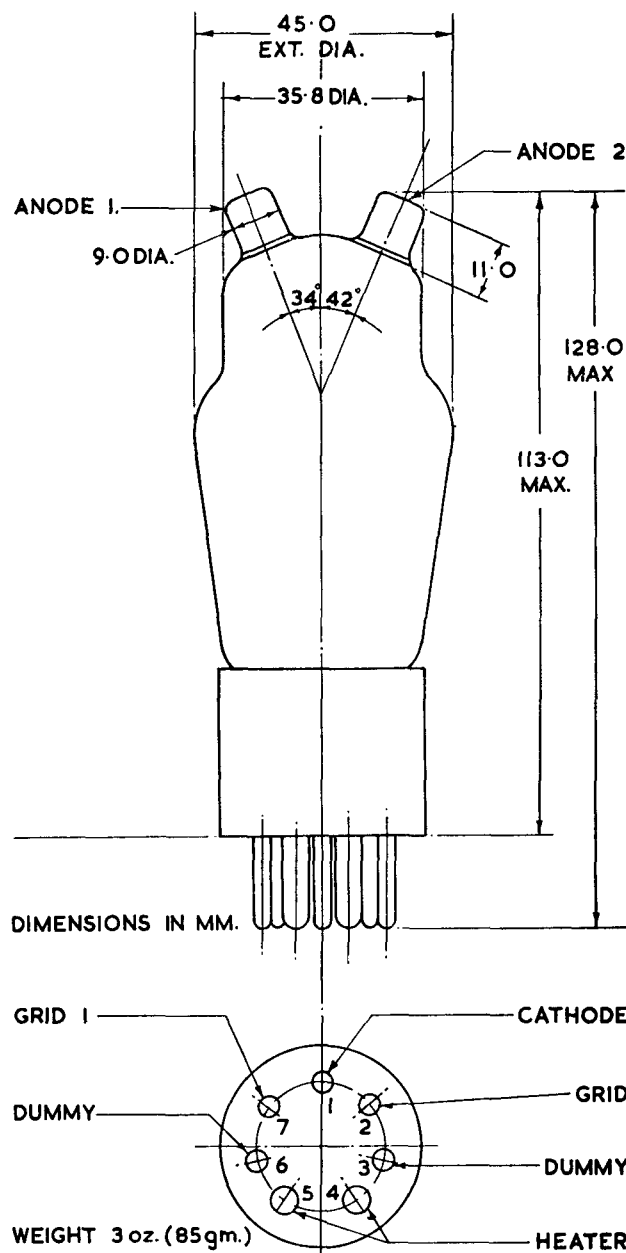
(1) PUSH-PULL RF AMPLIFIER. CLASS C TELEGRAPHY

(Key down conditions, per valve, without modulation)

Maximum permissible ratings

V_a	300	V
V_{gl}	-150	V
I_a	80	mA
I_{gl}	25	mA
P_a	24	W
P_a	10	W

both triodes



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Typical Operation					
f	7	7	7	7	Mc/s
V _a	300	250	200	150	V
I _a	80	80	70	65	mA
V _{g1} (i) from a fixed supply of	-50	-50	-50	-50	V
(ii) via R _k	625	625	715	770	Ω
(iii) via R _{g1-k}	3,300	2,800	2,800	2,500	Ω
I _{g1} (a)	15	18	18	20	mA
v _{g1'-g1''} (pk)	210	220	220	230	V
P _{dr} (a)	2	2.5	2.5	3	W
P _{out}	15.9	12.5	8.5	5.4	W
η	66.5	62.5	60.5	55.5	%

(2) PUSH-PULL ANODE MODULATED RF AMPLIFIER. CLASS C TELEPHONY

(Carrier conditions, per valve, permissible modulation 100%)

Maximum permissible ratings

V _a	250	V
V _{g1}	-150	V
I _a	55	mA
I _{g1}	25	mA
P _a	13.5	W
P _a	6.5	W

Typical Operation			
f	7	7	Mc/s
V _a	250	200	V
I _a	50	50	mA
V _g (i) from a fixed supply of	-45	-40	V
(ii) via R _k	900	800	Ω
(iii) via R _{g1-k}	6,500	5,000	Ω
I _{g1}	7	8	mA
v _{g1'-g1''} (pk)	180	170	V
P _{dr} (a)	1	1	W
P _{out}	8.5	6.5	W
η	68	65	%

(3) PUSH-PULL RF AMPLIFIER. CLASS B TELEPHONY

(Carrier conditions, per valve, permissible modulation 100%)

Maximum permissible ratings

V _a	300	V
I _a	45	mA
I _{g1}	25	mA
P _a	13.5	W
p _a	10	W

Typical Operation			
f	7	7	Mc/s
V _a	300	200	V
I _a	40	40	mA
V _g (i) from a fixed supply of (c)	-21	-13	V
(ii) via R _k (c)	525	325	Ω
I _{g1} (a)	1.8	3	mA
v _{g1'-g1''} (pk)	70	70	V
P _{dr} (a) (b)	1.5	2.2	W
P _{out}	3.5	2.3	W
η	29.3	28.3	%

(4) PUSH-PULL FREQUENCY DOUBLER

Maximum permissible ratings

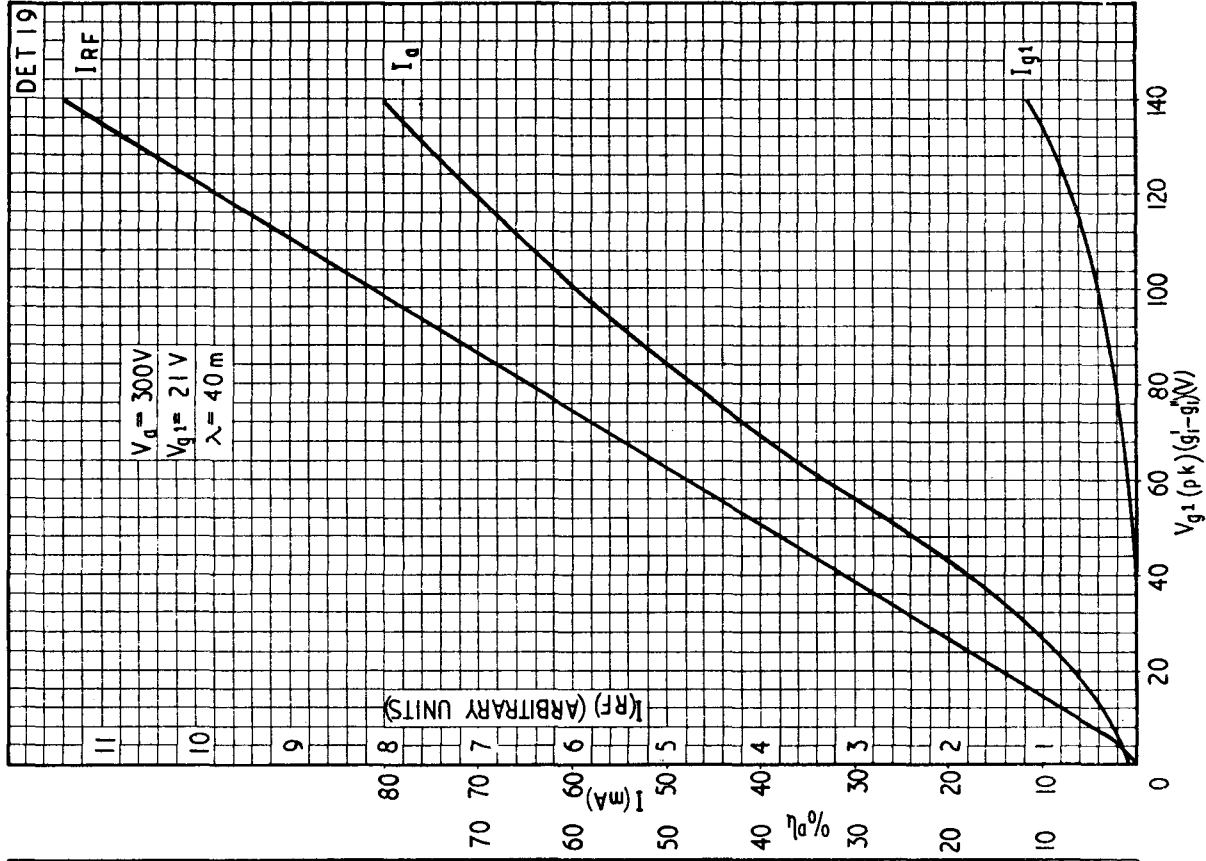
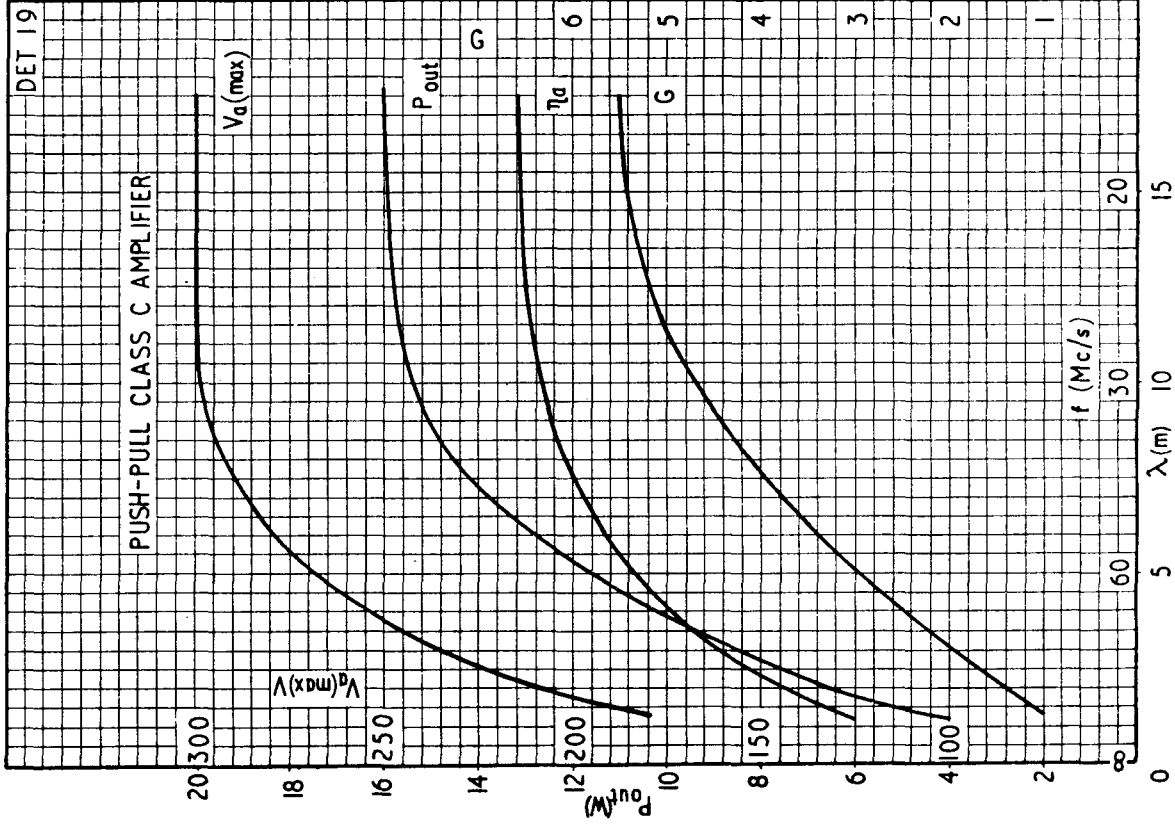
V _a	300	V
V _{g1}	-150	V
I _a	80	mA
I _{g1}	25	mA
P _a	24	W
p _a	10	W

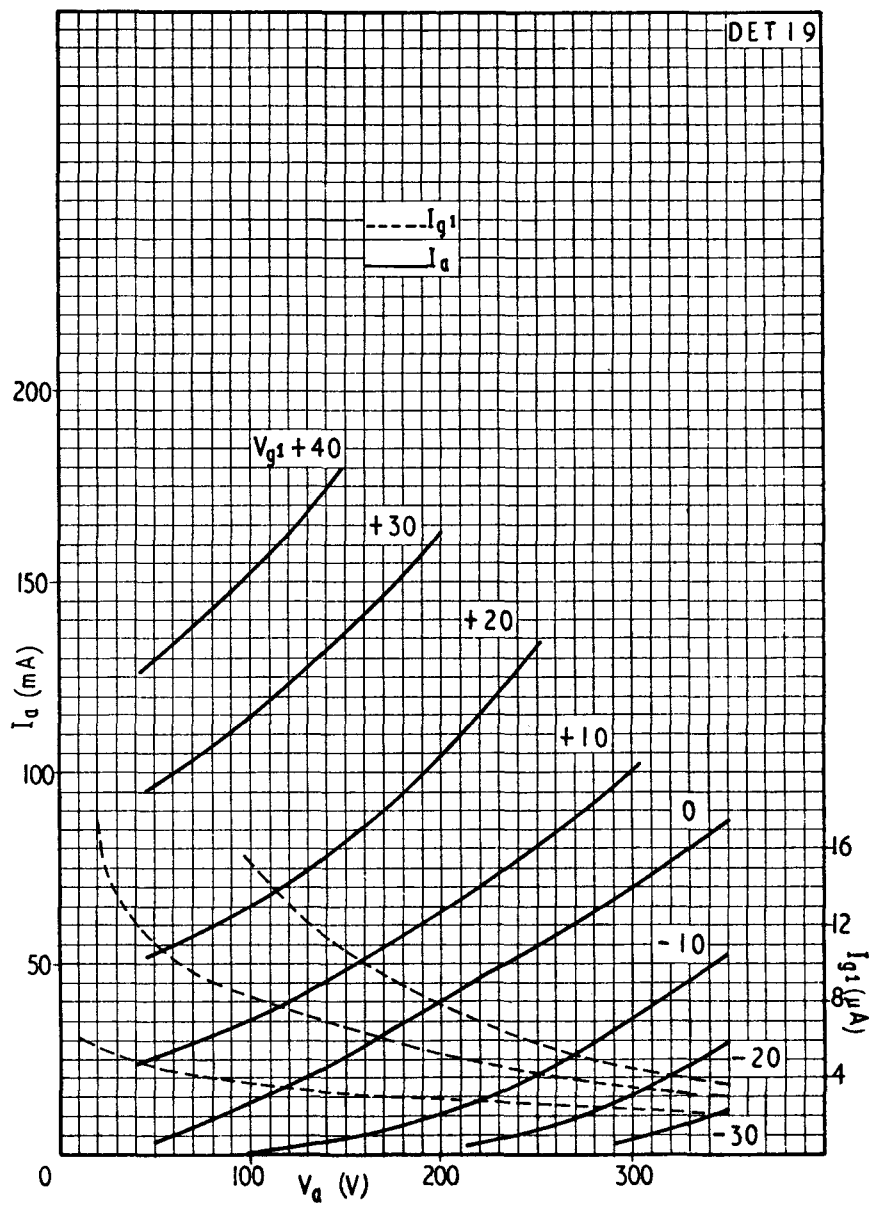
Typical Operation				
f _(exc)	7	7	7	40 Mc/s
f _(out)	14	14	14	80 Mc/s
V _a	300	250	200	250 V
I _a	70	70	70	60 mA

						Typical Operation		
V_{g1} (i) from a fixed supply of	-70	-70	-70	-150	V	$f_{(xtal)}$	7	Mc/s
(ii) via R_k	1,000	1,000	1,000	—	Ω	f_{out}	14	Mc/s
(iii) via R_{g1-k}	5,800	4,400	3,900	30,000	Ω	Triode (1) Crystal Oscillator		
I_{g1} (a)	12	16	18	5	mA	V_a (d)	250	V
$V_{g1}'-g1''$ (pk)	240	250	250	—	V	I_a	15	mA
P_{dr}	2.5	3	3	—	W	V_{g1} via R_{g1-k}	30,000	Ω
P_{out}	10.5	8	6.3	5.1	W	I_{g1}	0.8	mA
η	50	45.5	45	33	%	Triode (2) Frequency Doubler		
(5) CRYSTAL OSCILLATOR AND DOUBLER						V_a	300	V
<i>Maximum permissible ratings</i>						I_a	26	mA
V_a			300		V	V_{g1} (i) from a fixed supply of	-90	V
V_{g1}			-150		V	(ii) via R_{g1-k}	45,000	Ω
I_a			40		mA	I_{g1}	2	mA
P_a			5		W	P_{out}	2.8	W

NOTES

- Subject to wide variations depending on the impedance of the load circuit.
- At crest of modulation cycle.
- Grid leak operation is not permissible.
- The anode voltage applied to the first triode should be kept as low as is consistent with adequate output.







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