U.H.F. BEAM POWER TETRODES

YL1100 YL1102 YL1101 YL1103

TENTATIVE DATA

QUICK REFERENCE DATA

Beam power tetrodes intended for use as r.f. power amplifiers in transmitters, oscillators and frequency multipliers at frequencies up to 2000Mc/s.
YL1101 is similar to YL1100 except for heater ratings.
YL1102 and YL1103 are conduction-cooled versions of YL1100 and YL1101 respectively.

	Linear Amplifier for Television Service, Class 'AB$_1$'	Telephony, Anode and Screen Grid Modulation Class 'C'	Telegraphy or F.M. Telephony, Class 'C'		
f	790	400	400	1200	Mc/s
P_{load}	13	45	80	40	W
f max.	1200	1200	1200		Mc/s
V_a max.	1000	800	1000		V
p_a max.	115	75	115		W

Unless otherwise shown, data is applicable to all types

To be read in conjunction with

GENERAL OPERATIONAL RECOMMENDATIONS - TRANSMITTING VALVES

TELEGRAPHY OR F.M. TELEPHONY, CLASS 'C'

OPERATING CONDITIONS

	Grid Drive		Cathode Drive	
f	400	1200	1200	Mc/s
P_{out}	90	45	45	W
P_{load}	80	40	42*	W
η_a	68	29	29	%
V_a	900	900	900	V
I_a	170	170	170	mA
V_{g2}	300**	300**	300	V
I_{g2}	1.0	1.0	3.2	mA
$-V_{g1}$	30	22	31	V
I_{g1}	10	4.0	3.4	mA
$P_{load(driver)}$	3.0	5.0	8.0	W
p_a	43	108	108	W
p_{g2}	0.3	0.3	1.0	W

*Includes power transferred from driver stage.

**Fixed supply or supply derived from the anode supply by means of a voltage divider.

TELEPHONY, ANODE AND SCREEN-GRID MODULATION, CLASS 'C'

OPERATING CONDITIONS (Carrier conditions for 100% modulation)

f	400	Mc/s
P_{out}	50	W
P_{load}	45	W
η_a	54	%
V_a	700	V
I_a	130	mA
V_{g2}	250	V
I_{g2}	10	mA
$-V_{g1}$	50	V
I_{g1}	10	mA
$P_{load(driver)}$	3.0	W
p_a	41	W
p_{g2}	2.5	W
For 100% modulation		
P_{mod}	93	W
$v_{g2(pk)}$	150	V

LINEAR AMPLIFIER FOR TELEVISION SERVICE, CLASS 'AB$_1$'

Sound and vision

OPERATING CONDITIONS for valve in common grid circuit

f	790	Mc/s
Bandwidth (-1dB)	8.0	Mc/s
$P_{load(pk)}$	13	W
*Intermodulation products	-52	dB
V_{a-g1}	800	V
V_{g2-g1}	365	V
**V_{k-g1}	+15	V
$I_{a(o)}$	125	mA
$I_{a(max.sig.)}$	152	mA
I_{g2}	7.0	mA
I_{g1}	0	mA
†$P_{load(driver)pk}$	1.3	W

*The intermodulation product in the passband of the output signal is measured with reference to peak envelope output.

**Adjust to give the desired value of $I_{a(o)}$.

†The driver signal consists of three independent r.f. signal voltages.

i.e.	Picture carrier	- 8dB	with respect to the sum
	Sideband signal	- 17dB	signal amplitude of the
	Sound carrier	- 7dB	composite signal.

CATHODE

Indirectly heated, a.c. or d.c., oxide coated.

	YL1100 YL1102	YL1101 YL1103	
V_h	26.5	6.3	V
I_h	0.52	2.1	A
t_{h-k} min.	60	60	s

The heater voltage must be reduced depending on the operating conditions and the frequency

RATINGS (ABSOLUTE MAXIMUM SYSTEM)

	Television Class 'AB$_1$'	Telegraphy Class 'C'	Telephony Class 'C'	
f max.	1200	1200	1200	Mc/s
V_a max.	1000	1000	800	V
V_{g2} max.	300	300	300	V
$-V_{g1}$ max.	100	100	100	V
I_a max.	180	180	150	mA
p_a max.	115	115	75	W
p_{g2} max.	4.5	4.5	3.0	W
I_{g1} max.	-	30	30	mA
R_{g1-k} max.	30	30	30	kΩ

CAPACITANCES

c_{a-g1}	<0.065	pF
c_{g1-k+h}	14	pF
c_{a-k+h}	<0.015	pF
c_{g2-g1}	19	pF
c_{a-g2}	4.4	pF
c_{g2-k+h}	<0.4	pF

CHARACTERISTICS (measured at V_a = 1.0kV, V_{g2} = 250V, I_a = 100mA)

g_m	16	mA/V
μ_{g1-g2}	18	

MOUNTING POSITION

Any

COOLING

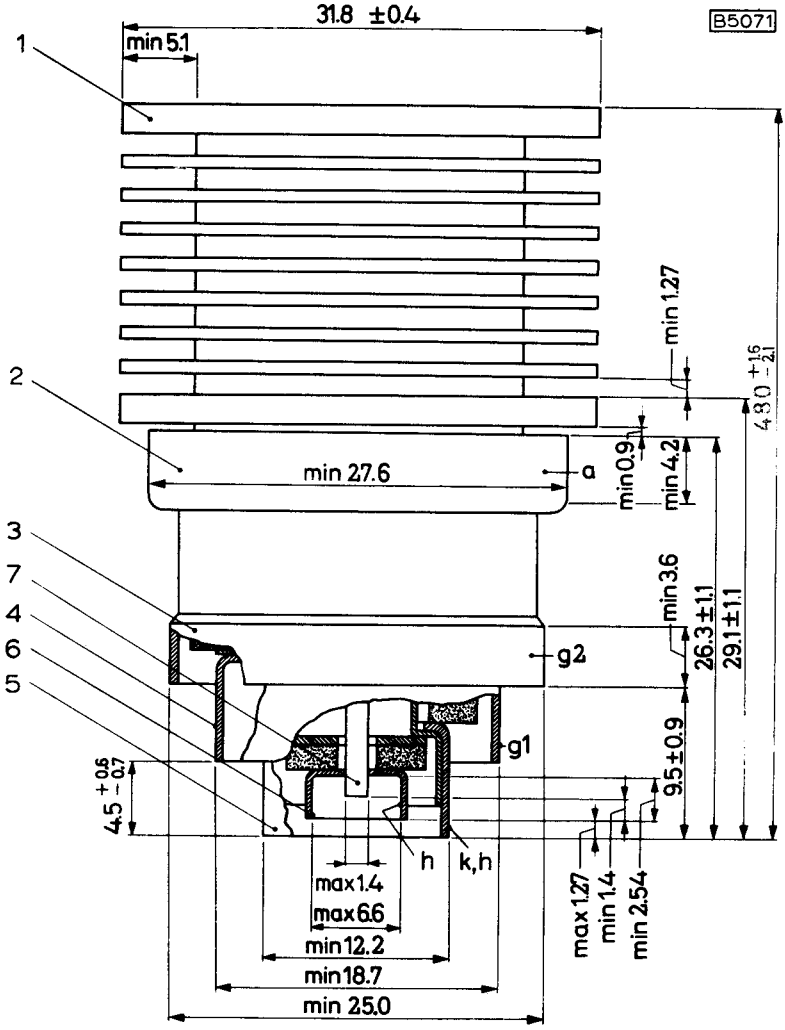
YL1100 and YL1101 - Forced-air cooling for radiator and seals.
YL1102 and YL1103 - Heat sink cooling.

Maximum temperature of anode and all seals	250	°C

PHYSICAL DATA

	oz	g
Weight of valve	2.0	60

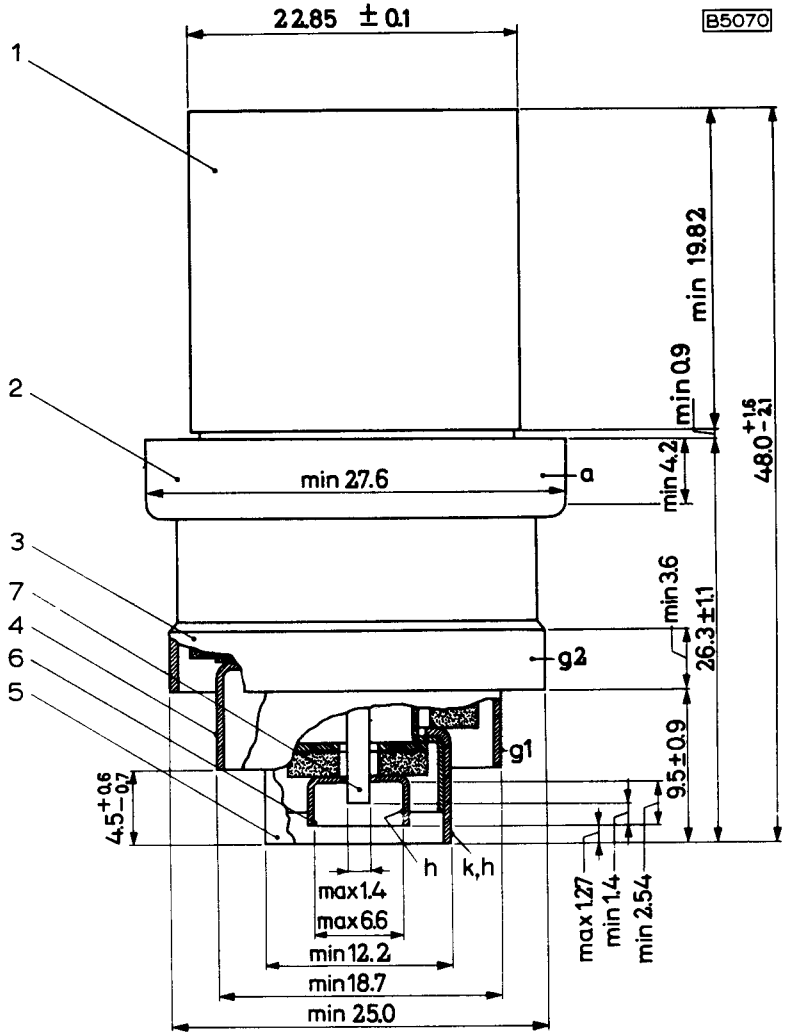
OUTLINE DRAWING OF YL1100 AND YL1101



Radiator and terminals lie inside or outside concentric cylinders:

1. Radiator	i.d. 33.40mm	5. Cathode terminal	i.d. 13.16mm
2. Anode terminal	i.d. 28.40mm	6. Heater terminals	o.d. 6.07mm
3. g_2 terminal	i.d. 25.86mm	7. Heater terminals	i.d. 1.78mm
4. g_1 terminal	i.d. 19.38mm		

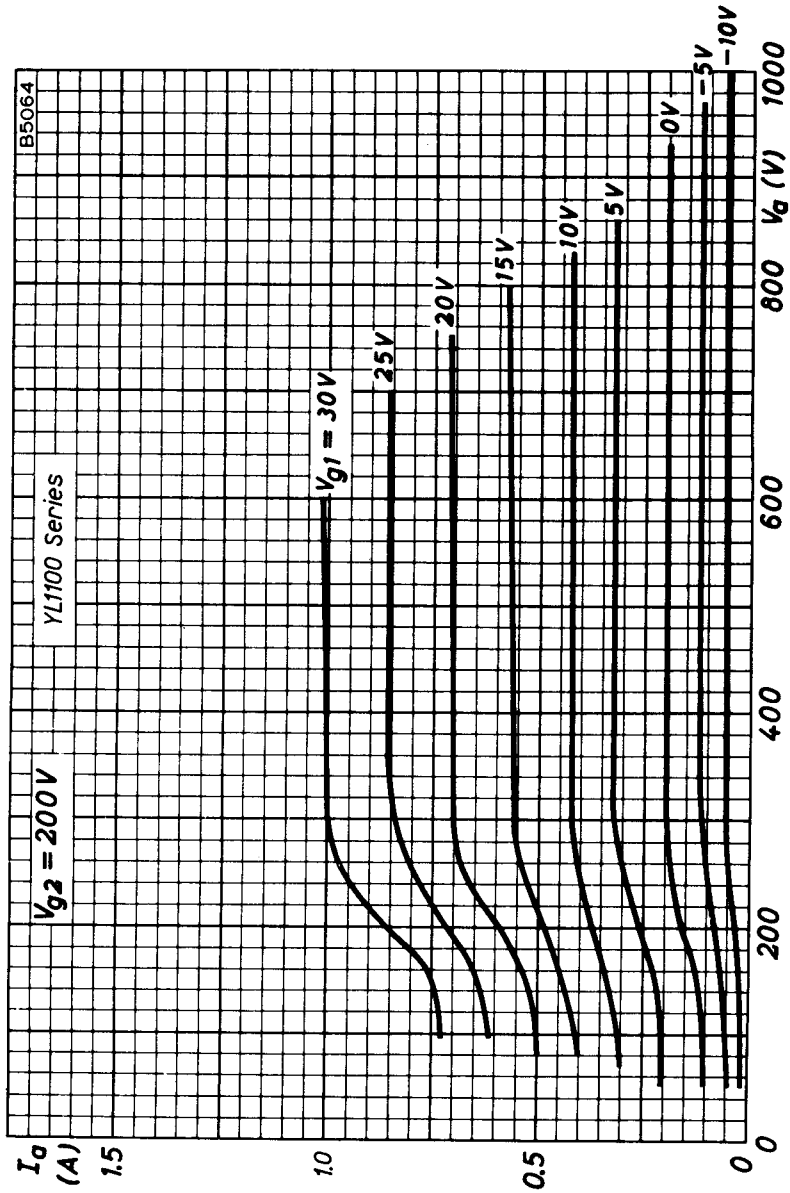
All dimensions in mm



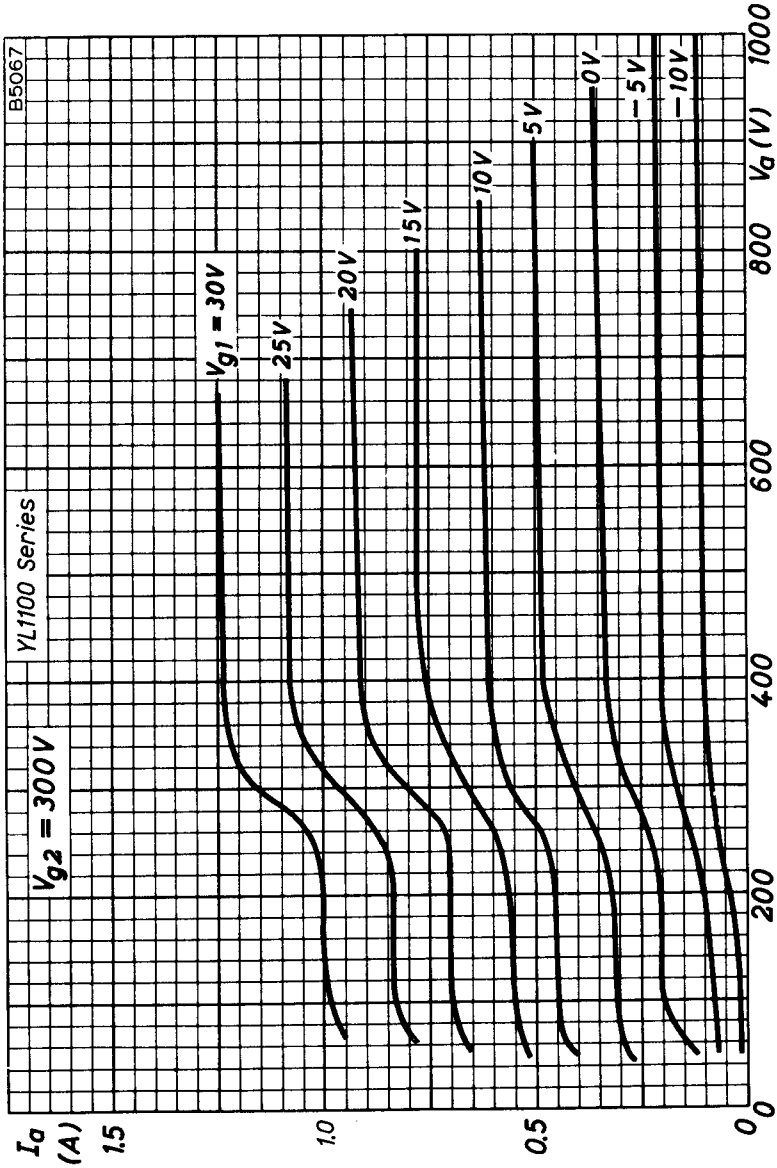
Cooling cylinder and terminals lie inside or outside concentric cylinders:

1. Cooling cylinder	i.d.	24.15mm	5. Cathode terminal	i.d.	13.16mm
2. Anode terminal	i.d.	28.40mm	6. Heater terminals	o.d.	6.07mm
3. g_2 terminal	i.d.	25.86mm	7. Heater terminals	i.d.	1.78mm
4. g_1 terminal	i.d.	19.38mm			

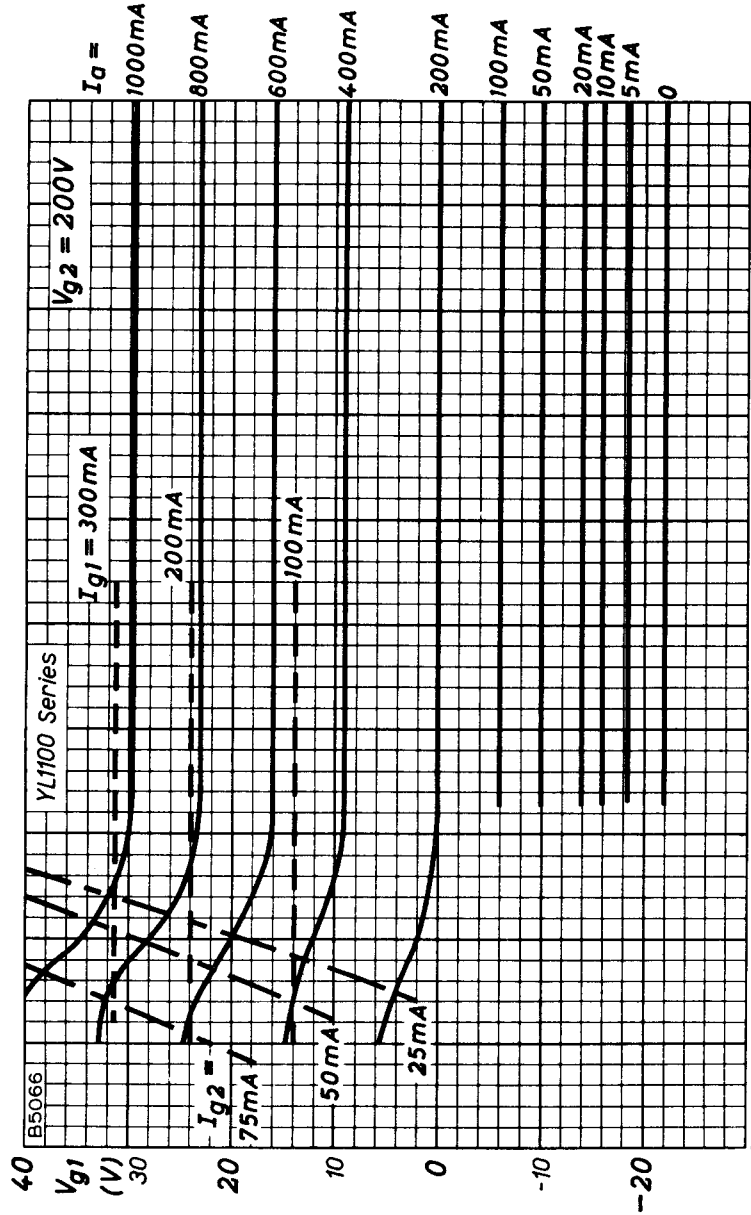
All dimensions in mm



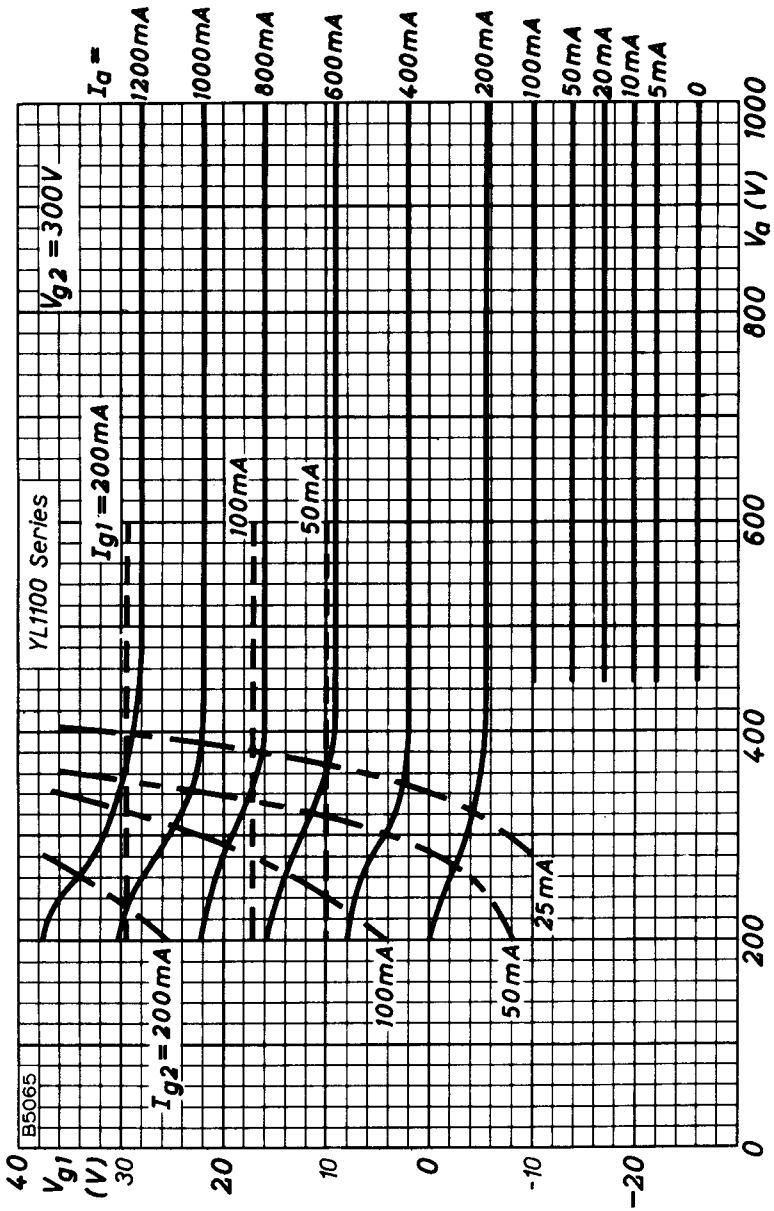
ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER. V_{g2} = 200V



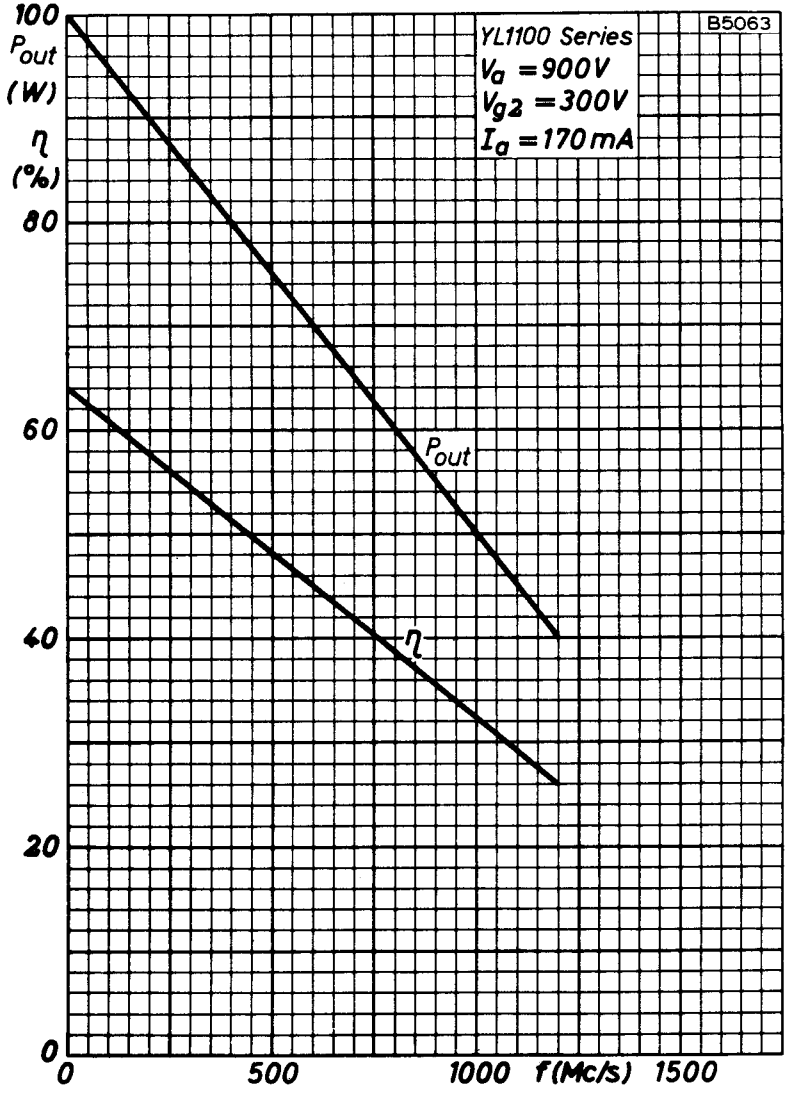
ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER. V_{g2} = 300V



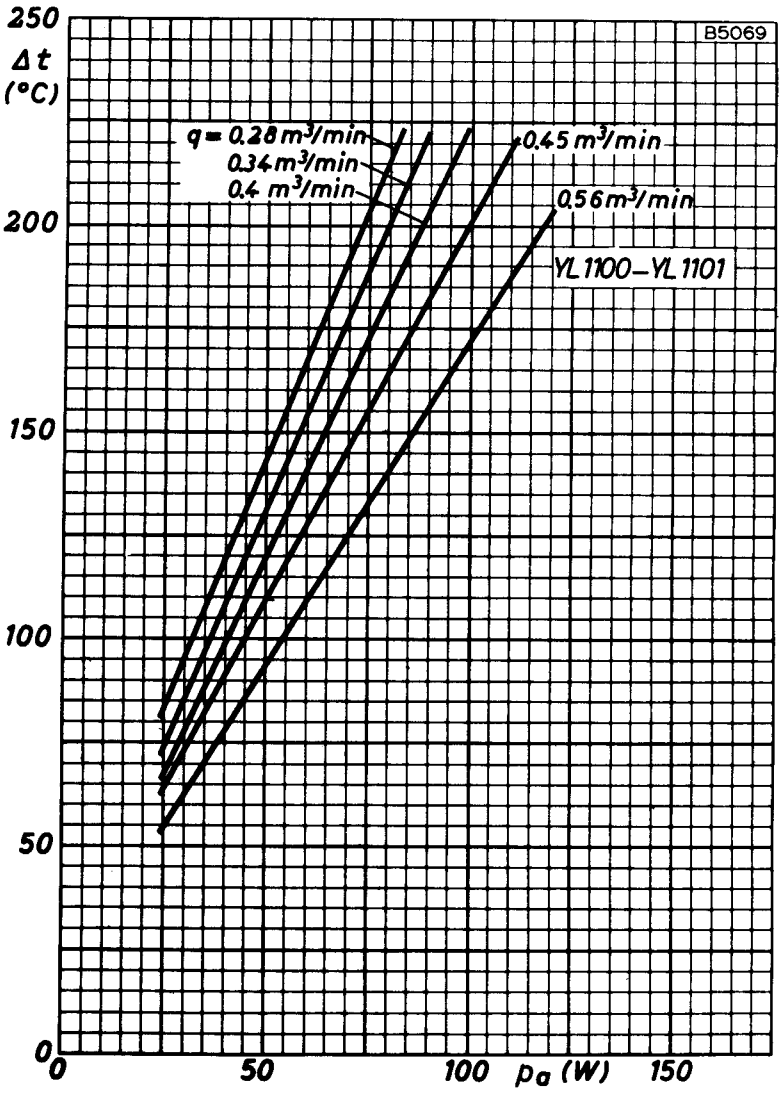
CONSTANT CURRENT CHARACTERISTICS. V_{g2} = 200V



CONSTANT CURRENT CHARACTERISTICS. V_{g2} = 300V

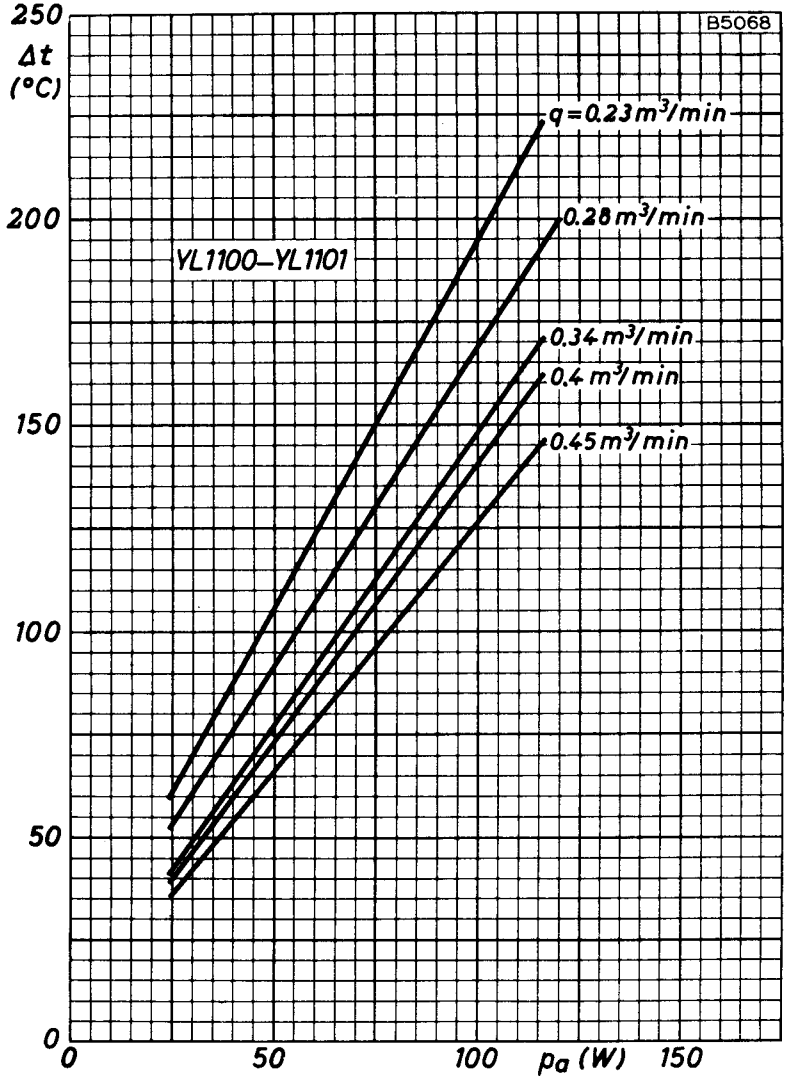


FREQUENCY CHARACTERISTICS FOR CLASS 'C' TELEGRAPHY
OPERATING CONDITIONS V_a = 900V, V_{g2} = 300V, I_a = 170mA



Difference of temperature (Δ_t = $t_{anode\ terminal}$ - $t_{incoming\ air}$) plotted against anode dissipation with rate of air flow as parameter. Air duct of 25 x 38mm. Distance between air duct opening and radiator is 32mm.

(To convert cubic metres to cubic feet multiply by 35.31)



Difference of temperature (Δ_t = $t_{anode\ terminal}$ - $t_{incoming\ air}$) plotted against anode dissipation with rate of air flow as parameter. Radiator in air duct of 25 x 38mm.

(To convert cubic metres to cubic feet multiply by 35.31)