

V.H.F./U.H.F. TETRODE for use as H.F. amplifier, oscillator, frequency-multiplier and modulator at frequencies up to 500 Mc/s

TETRODE V.H.F./U.H.F. pour utilisation en amplificatrice et oscillatrice H.F., multiplicatrice de fréquence et modulatrice à des fréquences jusqu'à 500 MHz

VHF/UHF-TETRODE zur Verwendung als HF-Verstärker und Oszillator, Frequenzvervielfacher und Modulator bei Frequenzen bis zu 500 MHz

Cathode : oxide-coated

Cathode : oxyde

Katode : Oxyd

Heating : indirect

Chauffage: indirect

Heizung : indirekt

$V_f = 6,0 \text{ V}$

$I_f = 2,6 \text{ A}$

$T_h = \text{min. } 30 \text{ sec}$

Capacitances

$C_a = 4,5 \text{ pF}$

Capacités

$C_{g1} = 15,5 \text{ pF}$

Kapazitäten

$C_{ag1} = 0,03 \text{ pF}$

Typical characteristics

Caractéristiques types

Kenndaten

$\mu g_{2g1} = 5$

$S \left\{ \begin{array}{l} V_a = 500 \text{ V} \\ V_{g2} = 250 \text{ V} \\ I_a = 200 \text{ mA} \end{array} \right\} = 12 \text{ mA/V}$

λ	Freq.	C telegr.		Cag2 mod.		AB mod					
(cm)	(Mc/s)	V_a (V)	W_o (W)	V_a (V)	W_o (W)	V_a (V)	$W_o^3)$ (W)	$W_o^4)$ (W)			
182	165	1250	195	1000	140	1250	310	425			
		1000	150	800	100	1000	240	315			
		750	110	600	80	800	195	240			
		600	85	400	55	600	140	170			
60	500	1250	140 ¹⁾								
		1000	110 ¹⁾								
		800	90 ¹⁾								
		600	65 ¹⁾								
				Televis.class B							
140	216			1250		250 ²⁾					
				1000		200 ²⁾					
				750		135 ²⁾					

¹⁾ Useful output power in load
Puissance de sortie dans la charge
Nützliche Ausgangsleistung in der Belastung

²⁾³⁾⁴⁾ See page 3; voir page 3; siehe Seite 3

Cooling

Forced air through the radiator and in general to the base end of the tube. Air flow and heater voltage must be applied simultaneously.

Seal temperature max. 150°C

Air-system socket (air-system chimney included) 40222⁵⁾

Air-system chimney (See page 4) 56 590 81/40

The use of this air-system socket with chimney is recommended, since a standard Localt socket does not ensure an adequate cooling of the base.

All four cathode connections should be used.

⁵⁾ Socket type 40222 is intended for circuits where the cathode is at chassis potential.

Refroidissement

Air forcé par le radiateur et en général à la partie inférieure du tube. Le courant d'air et la tension de chauffage seront appliqués simultanément.

Température des scellements max. 150°C

Support de tube pour le système de ventilation (y incluse la cheminée) 40222⁵⁾

Cheminée pour le système de ventilation (voir page 4) 56 590 81/40

L'usage du support de tube 40222 avec la cheminée 56 590 81/40 est recommandé, un support Localt normal n'assurant pas un refroidissement adéquat du culot du tube.

Il faut utiliser toutes les quatre connexions de cathode

⁵⁾ Le support de tube 40222 est destiné pour des circuits dont la cathode a le potentiel du châssis.

Kühlung

Pressluft durch den Kühler und im allgemeinen auf die Unterseite der Röhre. Luftströmung und Heizspannung müssen gleichzeitig eingeschaltet werden.

Temperatur der Einschmelzungen max. 150°C

Röhrenfassung für die Ventilationsanlage (Luftführungsring einbegriffen) 40222⁵⁾

Luftführungsring für die Ventilationsanlage (siehe Seite 4) 56 590 81/40

Da eine richtige Kühlung des Röhrenbodens von einem normalen Localtfassung nicht gesichert ist, wird die Verwendung der Röhrenfassung 40222 mit dem Führungsring 56 590 81/40 empfohlen.

Alle vier Katodenanschlüsse müssen verwendet werden.

⁵⁾ Die Fassung 40222 ist bestimmt für Schaltungen in denen die Katode das Chassispotential hat.

Cooling characteristics
Caractéristiques de refroidissement
Kühlungsdaten

The figures in this table apply to the simultaneous cooling of the radiator and the base, making use of the socket 40222 with chimney 56 590 81/40

Les nombres de cette liste s'appliquent au refroidissement simultané du radiateur et de la cote inférieure du tube, en utilisant le support 40222 avec la cheminée 56 590 81/40

Die Zahlen dieser Tafel gelten bei gleichzeitiger Kühlung des Kühlers und des Röhrenbodens, mit Verwendung der Fassung 40222 mit dem Schornstein 56 590 81/40

W _a (W)	h (m)	t _i (°C)	q (m ³ /min)	p _i (mm H ₂ O)
150	0	35	0,220	15,0
	0	45	0,258	19,8
	1500	35	0,264	18,3
	3000	25	0,278	17,5

Mounting position: arbitrary
Montage : arbitrairement
Einbau : willkürlich

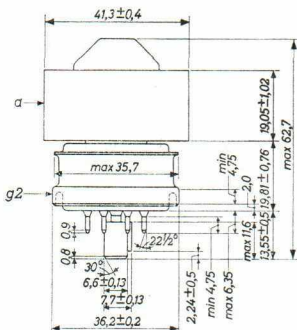
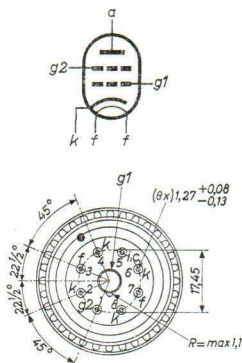
Net weight Shipping weight
Poids net 130 g Poids brut 300 g
Nettogewicht Bruttogewicht

²⁾ During sync-pulse peak
Pendant la crête de l'impulsion de synchronisation
Während des Scheitels des Synchronisierungsimpulses

³⁾ Two tubes. Without grid current
Deux tubes. Sans courant de grille
Zwei Röhren. Ohne Gitterstrom

⁴⁾ Two tubes. With grid current
Deux tubes. Avec courant de grille
Zwei Röhren. Mit Gitterstrom

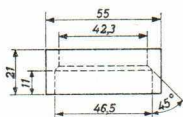
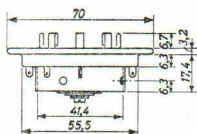
Dimensions in mm
Dimensions en mm
Abmessungen in mm



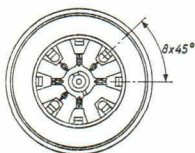
At higher frequencies the ring-surface terminal should be used for connecting the screen grid

A des fréquences élevées la connexion superficielle annulaire sera utilisée pour connecter la grille-écran

Bei höheren Frequenzen muss zum Anschliessen des Schirmgitters der Oberflächenkontaktring benutzt werden



Chimney, cheminée, Luftführungsring
56 590 81/40



Socket, support, Fassung
40222

H.F. class C telegraphy
H.F. classe C télégraphie
HF-Klasse C Telegraphie

Limiting values
Caractéristiques limites
Grenzdaten

f	= max.	500 Mc/s			
V_a	= max.	1250 V	V_{g2}	= max.	300 V
W_{ia}	= max.	300 W	W_{g2}	= max.	12 W
W_a	= max.	150 W	$-V_{g1}$	= max.	250 V
I_a	= max.	250 mA	W_{g1}	= max.	2 W

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

λ	$\geq$	180	180	180	180 cm
f	$\leq$	165	165	165	165 Mc/s
V_a	=	1250	1000	750	600 V
V_{g2}	=	250	250	250	250 V
V_{g1}	=	-90	-80	-80	-75 V
V_{g1p}	=	105	95	95	90 V
I_a	=	200	200	200	200 mA
I_{g2}	=	20	30	37	37 mA
I_{g1}	=	10	10	10	10 mA
$W_{ig1}^{1)}$	=	0,8	0,7	0,7	0,7 W
W_{g2}	=	5	7,5	9,3	9,3 W
W_{ia}	=	250	200	150	120 W
W_a	=	55	50	40	35 W
W_o	=	195	150	110	85 W
η	=	78	75	73,5	71 %

¹⁾ Driver output, circuit losses not included
Puissance de l'excitateur, ne pas y compris les pertes
du circuit
Leistung der Steuerstufe, Kringverluste nicht einbegriffen

H.F. class C telegraphy (continued)
 H.F. classe C télégraphie (continuation)
 HF-Klasse C Telegraphie (Fortsetzung)

Operating conditions, single tube, coaxial cavity
 Caractéristiques d'utilisation, tube simple, cavité
 coaxiale
 Betriebsdaten, eine Röhre, koaxialer Hohlraum

λ	$\geq$	60	60	60	60 cm
f	$\leq$	500	500	500	500 Mc/s
V_a	=	1250	1000	800	600 V
V_{g2}	=	250	250	250	250 V
V_{g1}	=	-80	-80	-80	-80 V
I_a	=	200	200	200	200 mA
I_{g2}	=	7	7	7	7 mA
I_{g1}	=	10	10	10	10 mA
W_{ig1}	=	10	10	10	10 W
W_{g2}	=	1,8	1,8	1,8	1,8 W
W_{ia}	=	250	200	160	120 W
W_o	=	140	110	90	65 W
η	=	56	55	56	54 %

H.F. class C anode and screen-grid modulation
 H.F. classe C modulation de l'anode et de la grille écran
 HF-Klasse C Anoden- und Schirmgittermodulation

Screen-grid modulation 55% at 100% anode modulation.
 Self-modulation of the screen-grid by means of a series resistor or choke should not be applied

Modulation de la grille écran 55% à 100% modulation de l'anode. Auto-modulation de la grille écran au moyen d'une résistance ou d'une bobine n'est pas recommandée

Schirmgittermodulation 55% bei einer Anodenmodulation von 100%. Selbstmodulation des Schirmgitters mittels eines Reihenwiderstandes oder einer Reihendrossel wird nicht empfohlen

H.F. class C anode and screen-grid modulation (continued)
H.F. classe C modulation de l'anode et de grille écran
(contiuation)
HF-Klasse C Anoden- und Schirmgittermodulation (Fort-
setzung)

Limiting values
Caractéristiques limites
Grenzdaten

V_a	= max.	1000 V	V_{g2}	= max.	300 V
W_{ia}	= max.	200 W	W_{g2}	= max.	12 W
W_a	= max.	100 W	$-V_{g1}$	= max.	250 V
I_a	= max.	200 mA	W_{g1}	= max.	2 W

Operating conditions
Caractéristiques d'utilisation
Betriebsdaten

λ	$\geq$	180	180	180	180 cm
f	$\leq$	165	165	165	165 Mc/s
V_a	=	1000	800	600	400 V
V_{g2}	=	250	250	250	250 V
V_{g1}	=	-105	-100	-95	-90 V
V_{g1p}	=	125	120	120	110 V
I_a	=	200	200	200	200 mA
I_{g2}	=	20	25	35	40 mA
I_{g1}	=	15	10	8	7 mA
W_{ig1}	=	2	1,5	1	1 W
W_{g2}	=	5	6,3	8,8	10 W
W_{ia}	=	200	160	120	80 W
W_a	=	60	60	40	25 W
W_o	=	140	100	80	55 W
η	=	70	63	66	62 %
m	=	100	100	100	100 %
V_{g2p}	=	170	160	150	140 V
W_{mod}	=	100	80	60	40 W

H.F. class B amplifier for television service, negative modulation, positive synchronisation
 Amplificatrice H.F. classe B pour télévision, modulation négative, synchronisation positive
 HF-Klasse B Verstärker für Fernsender, negative Modulation, positive Synchronisierung

Limiting values
 Caractéristiques limites
 Grenzdaten

$f_{-} = \text{max. } 220 \text{ Mc/s}$	$I_a = \text{max. } 250 \text{ mA}$
$V_a = \text{max. } 1250 \text{ V}$	$W_a = \text{max. } 150 \text{ W}$
$V_{g2} = \text{max. } 400 \text{ V}$	$W_{g2} = \text{max. } 12 \text{ W}$
$-V_{g1} = \text{max. } 250 \text{ V}$	$W_{g1} = \text{max. } 2 \text{ W}$

Operating conditions
 Caractéristiques d'utilisation
 Betriebsdaten

f	=	216	216	216 Mc/s
B	=	5	5	5 Mc/s
V_a	=	1250	1000	750 V
V_{g2}	=	300	300	300 V
V_{g1}	=	-70	-65	-60 V
$V_{g1p} \text{ sync}$	=	100	95	85 V
$V_{g1p} \text{ black, noir, schwarz}$	=	75	70	65 V
$I_a \text{ sync}$	=	305	330	335 mA
$I_a \text{ black, noir, schwarz}$	=	230	240	245 mA
$I_{g2} \text{ sync}$	=	45	45	50 mA
$I_{g2} \text{ black, noir, schwarz}$	=	10	15	20 mA
$I_{g1} \text{ sync}$	=	25	20	15 mA
$I_{g1} \text{ black, noir, schwarz}$	=	4	4	4 mA
$W_{ig1} \text{ sync}$	=	9	8	7 W
$W_{ig1} \text{ black, noir, schwarz}$	=	5,5	4,7	4,25 W
$W_{ia} \text{ black, noir, schwarz}$	=	290	240	185 W
$W_o \text{ sync}$	=	250	200	135 W
$W_o \text{ black, noir, schwarz}$	=	140	110	75 W

L.F.class AB amplifier and modulator
 Amplificatrice et modulatrice B.F. classe AB
 NF-Verstärker und Modulator Klasse AB

Limiting values
 Caractéristiques limites
 Grenzdaten

V_a	= max.	1250 V	W_{g2}	= max.	12 W
W_{ia}	= max.	300 W	W_{g1}	= max.	2 W
W_a	= max.	150 W	R_{g1}	= max.	100 k Ω ¹⁾
I_a	= max.	250 mA			
V_{g2}	= max.	400 V			

Operating conditions, two tubes without grid current
 Caractéristiques d'utilisation, deux tubes sans courant de grille
 Betriebsdaten, zwei Röhren ohne Gitterstrom

V_a	=	1250	1000	V
V_{g2}	=	300	300	V
V_{g1}	=	-48	-47	V
R_{aa}	=	7200	5850	Ω
V_{g1g1p}	=	0 96	0 94	V
I_a	=	2x57,5 2x195	2x60 2x190	mA
I_{g2}	=	0 2x20	0 2x30	mA
W_{g2}	=	0 2x6	0 2x9	W
W_{ia}	=	2x72 2x244	2x60 2x190	W
W_a	=	2x72 2x89	2x60 2x70	W
W_o	=	0 310	0 240	W
η	=	- 63,5	- 63	%

¹⁾ Each tube
 Chaque tube
 Jede Röhre

L.F.class AB amplifier and modulator (continued)
 Amplificatrice et modulatrice B.F. classe AB(continuation)
 NF-Verstärker und Modulator Klasse AB(Fortsetzung)

Operating conditions, two tubes without grid current
 Caractéristiques d'utilisation, deux tubes sans courant de grille
 Betriebsdaten, zwei Röhren ohne Gitterstrom

V_a	=	800	600	V
V_{g2}	=	300	300	V
V_{g1}	=	-47	-44	V
R_{aa}	=	4625	3550	Ω
V_{g1g1p}	=	$\overbrace{0 \quad 94}$	$\overbrace{0 \quad 88}$	V
I_a	=	2x60 2x190	2x80 2x190	mA
I_{g2}	=	0 2x32,5	0 2x32,5	mA
W_{g2}	=	0 2x9,8	0 2x9,8	W
W_{ia}	=	2x48 2x152	2x48 2x114	W
W_a	=	2x48 2x55	2x48 2x44	W
W_o	=	0 195	0 140	W
η	=	- 64	- 61	%

Operating conditions, two tubes with grid current
 Caractéristiques d'utilisation deux tubes à courant de grille
 Betriebsdaten, zwei Röhren mit Gitterstrom

V_a	=	1250	1000	V
V_{g2}	=	300	300	V
V_{g1}	=	-44	-43	V
R_{aa}	=	5600	4600	Ω
V_{g1g1p}	=	$\overbrace{0 \quad 100}$	$\overbrace{0 \quad 98}$	V
I_a	=	2x90 2x238	2x82,5 2x247	mA
I_{g2}	=	0 2x32,5	0 2x35	mA
I_{g1p}	=	0 10	0 10	mA
W_{ig1}	=	0 2x0,037	0 2x0,037	W
W_{g2}	=	0 2x10	0 2x10	W
W_{ia}	=	2x112 2x297	2x82,5 2x247	W
W_a	=	2x112 2x85	2x82,5 2x90	W
W_o	=	0 425	0 315	W
η	=	- 72	- 64	%

L.F.class AB amplifier and modulator (continued)
 Amplificatrice et modulatrice B.F. classe AB(cont.)
 NF-Verstärker und Modulator Klasse AB (Fortsetzung)

Operating conditions, two tubes with grid current
 Caractéristiques d'utilisation, deux tubes à courant
 de grille
 Betriebsdaten, zwei Röhren mit Gitterstrom

V_a	=	800	600	V
V_{g2}	=	300	300	V
V_{g1}	=	-43	-41	V
R_{aa}	=	3500	2600	Ω
V_{g1g1p}	=	0 96	0 94	V
I_a	=	2x80 2x245	2x92,5 2x243	mA
I_{g2}	=	0 2x37,5	0 2x42,5	mA
I_{g1p}	=	0 10	0 10	mA
W_{ig1}	=	0 2x0,037	0 2x0,037	W
W_{g2}	=	0 2x11	0 2x12,7	W
W_{ia}	=	2x64 2x196	2x55,5 2x146	W
W_a	=	2x64 2x76	2x55,5 2x61	W
W_o	=	0 240	0 170	W
η	=	- 61	- 58	%

4. The fourth part of the document discusses the implications of the findings for future research and practice. It suggests that the results of this study could be used to inform policy decisions and to guide the development of new programs and initiatives.

5. The fifth part of the document provides a summary of the key points discussed in the previous sections. It reiterates the importance of accurate record-keeping and the need for ongoing research in this field.

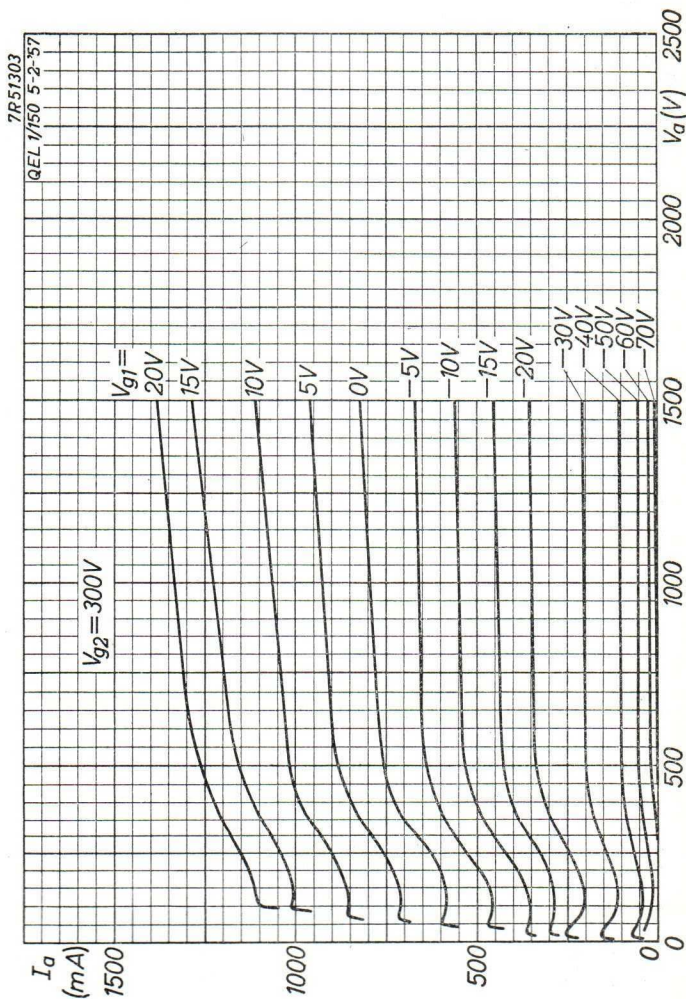
6. The sixth part of the document includes a list of references to the sources used in the study. These references provide additional information on the topics discussed in the document and allow readers to explore the literature further.

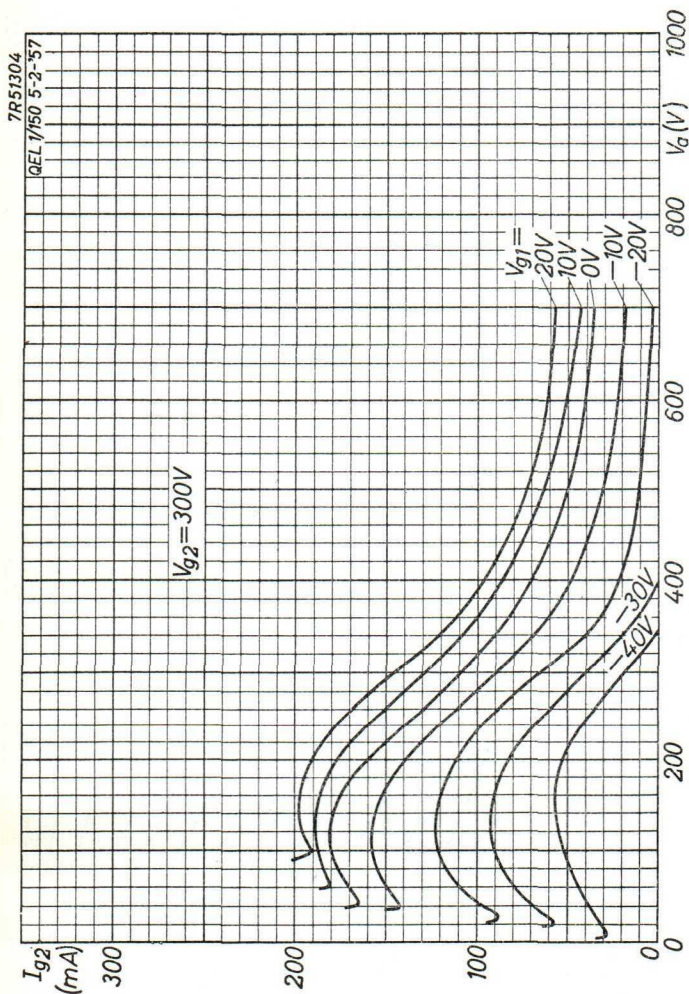
7. The seventh part of the document contains a list of appendices that provide additional data and information related to the study. These appendices are included to support the findings and to provide a more complete picture of the research.

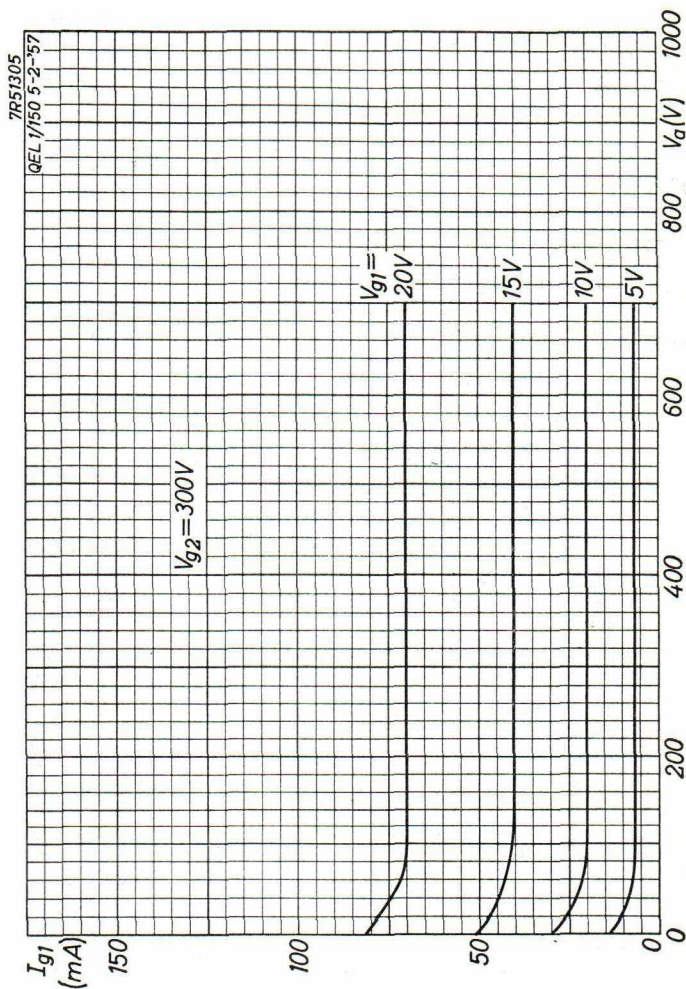
8. The eighth part of the document includes a list of figures and tables that illustrate the data and results. These visual aids help to make the information more accessible and easier to understand.

9. The ninth part of the document contains a list of footnotes that provide additional information on specific points discussed in the text. These footnotes are included to provide more detail and to clarify any potential ambiguities.

10. The tenth part of the document includes a list of acknowledgments that thank the individuals and organizations that provided support and assistance during the course of the study. These acknowledgments are included to recognize the contributions of others and to express appreciation for their help.







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PHILIPS

