

SPECIAL QUALITY, LONG LIFE, RUGGEDISED TRIODE-PENTODE with separate cathode leads; the pentode section is for use as mixer, R.F. or A.F. amplifier, the triode section for use as oscillator up to 300 Mc/s, multivibrator or blocking oscillator.

The E80CF is shock and vibration resistant and will maintain its emission capabilities after long periods of operation under cut-off conditions.

HEATING

Indirect by A.C. or D.C.; parallel supply

Heater voltage $V_f = 6.3 \text{ V}$

Heater current $I_f = 330 \text{ mA} \pm 5\%$

Remark. In order to obtain a prolonged tube life, the maximum variation of the heater voltage should be less than $\pm 5\%$ (absolute limits).

CAPACITANCES (the numbers denote tube pin numbers)

Pentode section

Grid No.1 to all other elements except anode	$C_{g1} = 5.6 \pm 0.4 \text{ pF}$ (pin 2 to 3+4+5+7)
Anode to all other elements except grid No.1	$C_a = 3.4 \pm 0.4 \text{ pF}$ (pin 6 to 3+4+5+7)
Anode to grid No.1	$C_{ag1} (6 \text{ to } 2) < 0.025 \text{ pF}$
Grid No.1 to heater	$C_{g1f} (2 \text{ to } 4+5) < 0.16 \text{ pF}$

Triode section

Grid to all other elements except anode	$C_g = 2.5 \pm 0.3 \text{ pF}$ (pin 9 to 4+5+7+8)
Anode to all other elements except grid	$C_a = 1.5 \pm 0.3 \text{ pF}$ (pin 1 to 4+5+7+8)
Anode to grid	$C_{ag} (1 \text{ to } 9) = 1.5 \pm 0.3 \text{ pF}$
Grid to heater	$C_{gf} (9 \text{ to } 4+5) < 0.22 \text{ pF}$

Between pentode and triode sections

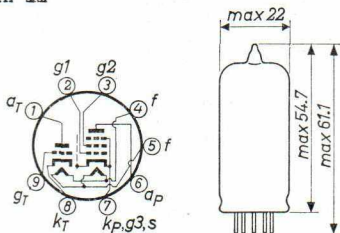
Pentode anode to triode anode	$C_{aP-aT} (6 \text{ to } 1) < 0.07 \text{ pF}$
Pentode anode to triode grid	$C_{aP-gT} (6 \text{ to } 9) < 0.02 \text{ pF}$
Pentode grid No.1 to triode anode	$C_{g1P-aT} (2 \text{ to } 1) < 0.16 \text{ pF}$

REMARK

It is recommended to employ the triode in a Colpitts type of circuit and not in a Hartley type

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Dimensions in mm



Base: NOVAL

TYPICAL CHARACTERISTICSPentode section

Anode supply voltage	V_{ba}	=	170 V
Grid No.2 supply voltage	V_{bg2}	=	170 V
Cathode resistor	R_k	=	155 Ω
Anode current	I_a	=	10 ± 2.5 mA
Grid No.2 current	I_{g2}	=	2.8 ± 1.25 mA
Mutual conductance	S	=	6.2 ± 1.0 mA/V
Amplification factor of grid No.2 with respect to grid No.1	μ_{g2g1}	=	40
		=	0.4 M Ω
Internal resistance	R_1	>	0.26 M Ω
Negative grid No.1 current	$-I_{g1}$	= max.	0.5 μ A

Triode section

Anode supply voltage	V_{ba}	=	100 V
Cathode resistor	R_k	=	120 Ω
Anode current	I_a	=	14 ± 4.0 mA
Mutual conductance	S	=	5.0 ± 1.0 mA/V
Amplification factor	μ	=	18
Negative grid current	$-I_g$	= max.	0.5 μ A

MICROPHONY

The pentode section can be used without special precautions against microphonic effect in circuits in which the input voltage ≥ 50 mV for an output of 50 mW of the output stage.

LIFE EXPECTANCY: 10 000 hours

The end point of life is reached when under the conditions mentioned under "Typical characteristics" one or more of the characteristics have changed to the following values:

Pentode section

Anode current	I_a	→	6 mA
Mutual conductance	S	→	4.3 mA/V
Negative grid No.1 current	$-I_{g1}$	→	1 μ A

Triode section

Anode current	I_a	→	8.4 mA
Mutual conductance	S	→	3.5 mA/V
Negative grid current	$-I_g$	→	1 μ A

OPERATING CHARACTERISTICS of the pentode section as R.F. amplifier

Anode supply voltage	V_{ba}	=	170 V
Grid No.2 supply voltage	V_{bg2}	=	170 V
Cathode resistor	R_k	=	155 Ω
Anode current	I_a	=	10 mA
Grid No.2 current	I_{g2}	=	2.8 mA
Mutual conductance	S	=	6.2 mA/V
Amplification factor of grid No.2 with respect to grid No.1	μ_{g2g1}	=	40
Internal resistance	R_i	=	0.4 M Ω
Input resistance at 50 Mc/s	$r_{g1}(f=50 \text{ Mc/s})$	=	10 k Ω
Equivalent noise resistance	R_{eq}	=	1.5 k Ω

OPERATING CHARACTERISTICS of the pentode section as mixer

Anode supply voltage	V_{ba}	=	170 V
Grid No.2 supply voltage	V_{bg2}	=	170 V
Grid No.1 resistor	R_{g1}	=	0.1 M Ω
Cathode resistor	R_k	=	330 Ω
Oscillator voltage	V_{osc}	=	3.5 V (RMS)
Anode current	I_a	=	8 mA
Grid No.2 current	I_{g2}	=	2.5 mA
Grid No.1 current	I_{g1}	=	12 μ A
Conversion conductance	S_c	=	2.4 mA/V
Internal resistance	R_i	=	0.5 M Ω

SHOCK RESISTANCE: about 500 g ¹⁾

Forces as applied by the NRL impact machine for electronic devices caused by 5 blows of the hammer lifted over an angle of 30° in each of four different positions of the tube

VIBRATION RESISTANCE: 2.5 g ¹⁾

Vibrational forces for a period of 32 hours at a frequency of 50 c/s in each of three directions.

LIMITING VALUES (Absolute limits)

Bulb temperature

$t_{bulb} = \text{max. } 170^{\circ}\text{C}$

Triode section

Anode voltage in cold condition

$V_{a0} = \text{max. } 550 \text{ V}$

Anode voltage

$V_a = \text{max. } 275 \text{ V}$

Anode dissipation

$W_a = \text{max. } 1.75 \text{ W}$

Grid dissipation

$W_g = \text{max. } 0.1 \text{ W}$

Peak positive grid voltage

$+V_{gp} = \text{max. } 30 \text{ V}^2)$

Negative grid voltage

$-V_g = \text{max. } 100 \text{ V}$

Grid circuit resistance

$R_g = \text{max. } 0.5 \text{ M}\Omega$

Cathode current

$I_k = \text{max. } 18 \text{ mA}$

Peak cathode current

$I_{kp} = \text{max. } 100 \text{ mA}^2)$

Voltage between cathode and heater

$V_{kf} = \text{max. } 100 \text{ V}$

Pentode section

Anode voltage in cold condition

$V_{a0} = \text{max. } 550 \text{ V}$

Anode voltage

$V_a = \text{max. } 275 \text{ V}$

Anode dissipation

$W_a = \text{max. } 2.15 \text{ W}$

Grid No.2 voltage in cold condition

$V_{g20} = \text{max. } 550 \text{ V}$

Grid No.2 voltage when cathode current higher than 10 mA

$V_{g2}(I_k > 10 \text{ mA}) = \text{max. } 200 \text{ V}$

Grid No.2 voltage when cathode current lower than 10 mA

$V_{g2}(I_k < 10 \text{ mA}) = \text{max. } 225 \text{ V}$

¹⁾ These test conditions are only given for evaluation of the ruggedness of the tube and should by no means be interpreted as suitable operating conditions.

²⁾ Max. pulse duration 4 % of a cycle, with a maximum of 0.8 msec.

LIMITING VALUES (Absolute limits; continued)Pentode section (continued)

Grid No.2 dissipation when anode dissipation higher than 1.2 W	$W_{G2}(W_a > 1.2 \text{ W}) = \text{max. } 0.7 \text{ W}$
Grid No.2 dissipation when anode dissipation lower than 1.2 W	$W_{G2}(W_a < 1.2 \text{ W}) = \text{max. } 0.8 \text{ W}$
Grid No.1 dissipation	$W_{G1} = \text{max. } 0.1 \text{ W}$
Negative grid No.1 voltage	$-V_{G1} = \text{max. } 100 \text{ V}$
Grid No.1 circuit re- sistance with automa- tic bias	$R_{G1} = \text{max. } 1 \text{ M}\Omega$
Grid No.1 circuit re- sistance with fixed bias	$R_{G1} = \text{max. } 0.5 \text{ M}\Omega$
Cathode current	$I_k = \text{max. } 18 \text{ mA}$
Voltage between cathode and heater	$V_{kf} = \text{max. } 100 \text{ V}$

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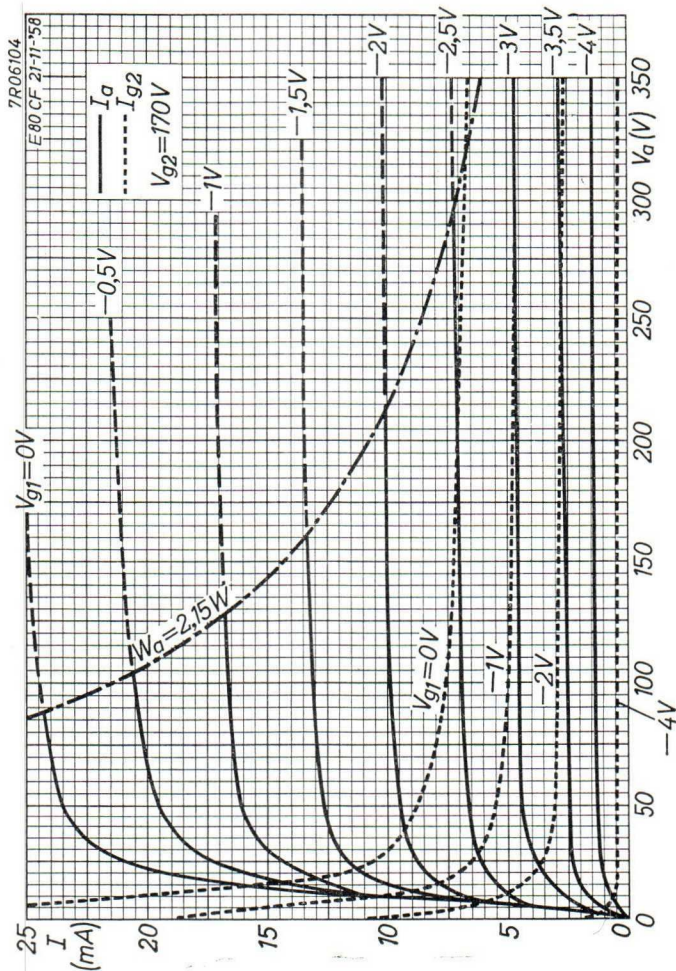
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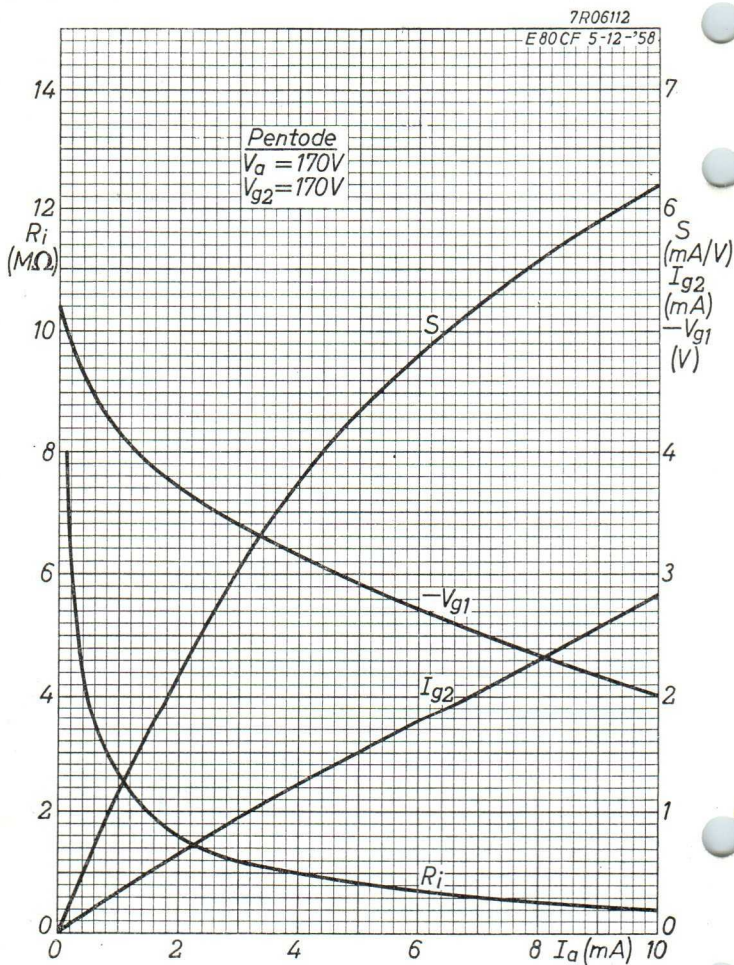
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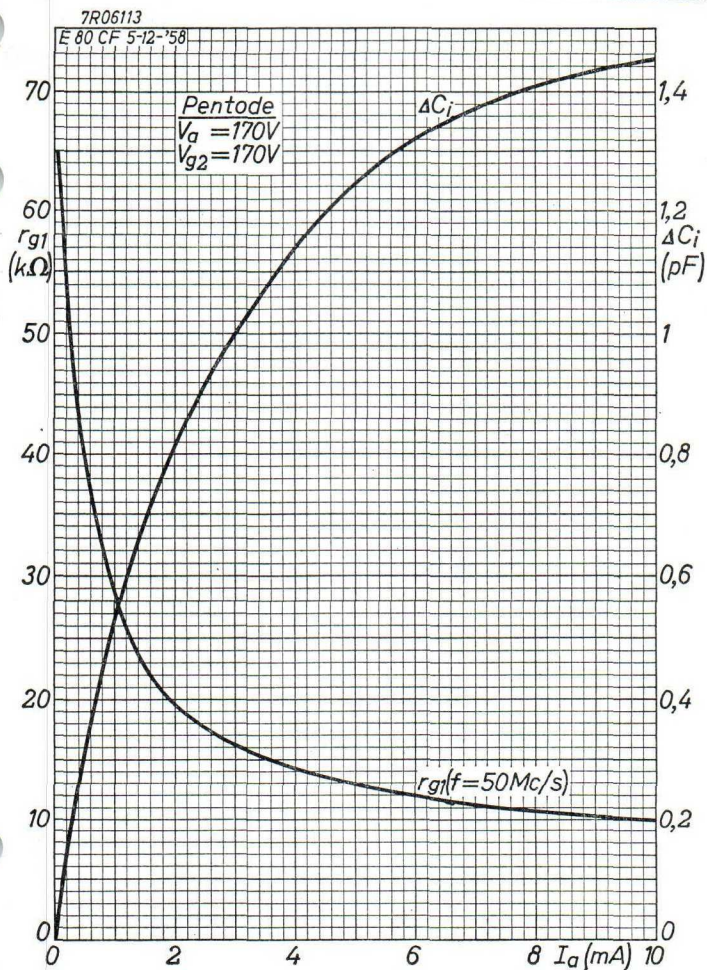
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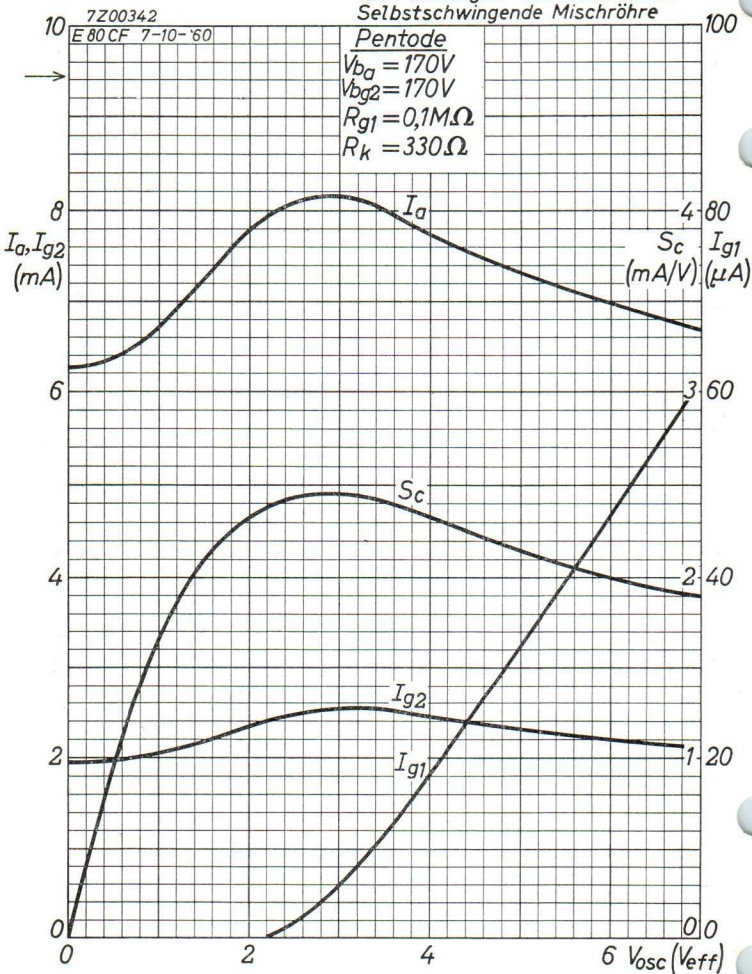
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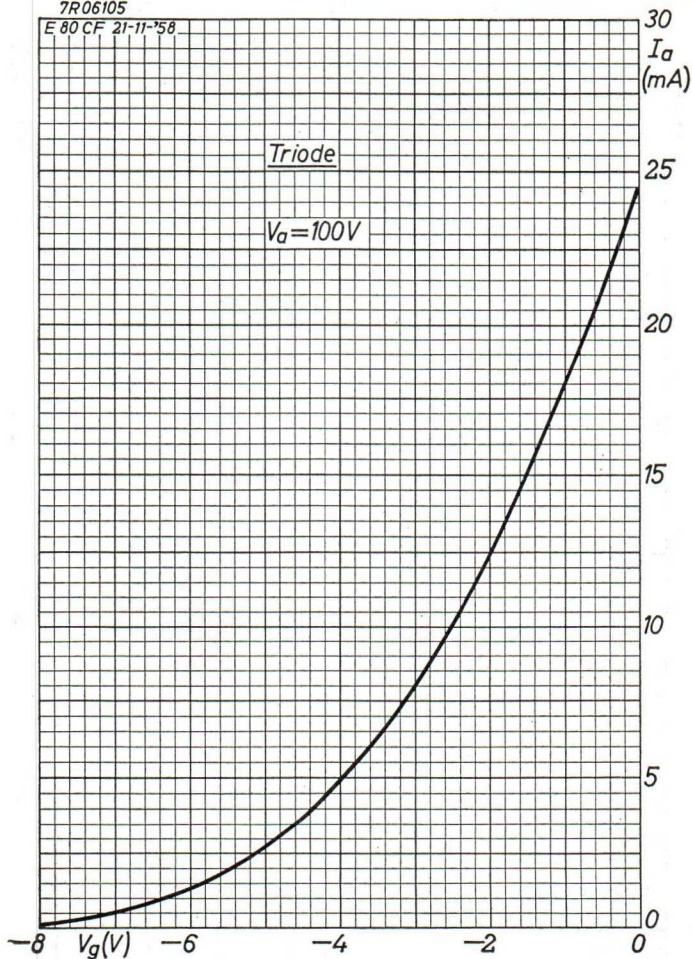
Self-oscillating frequency-changer
Tube mélangeur auto-oscillateur
Selbstschwingende Mischröhre



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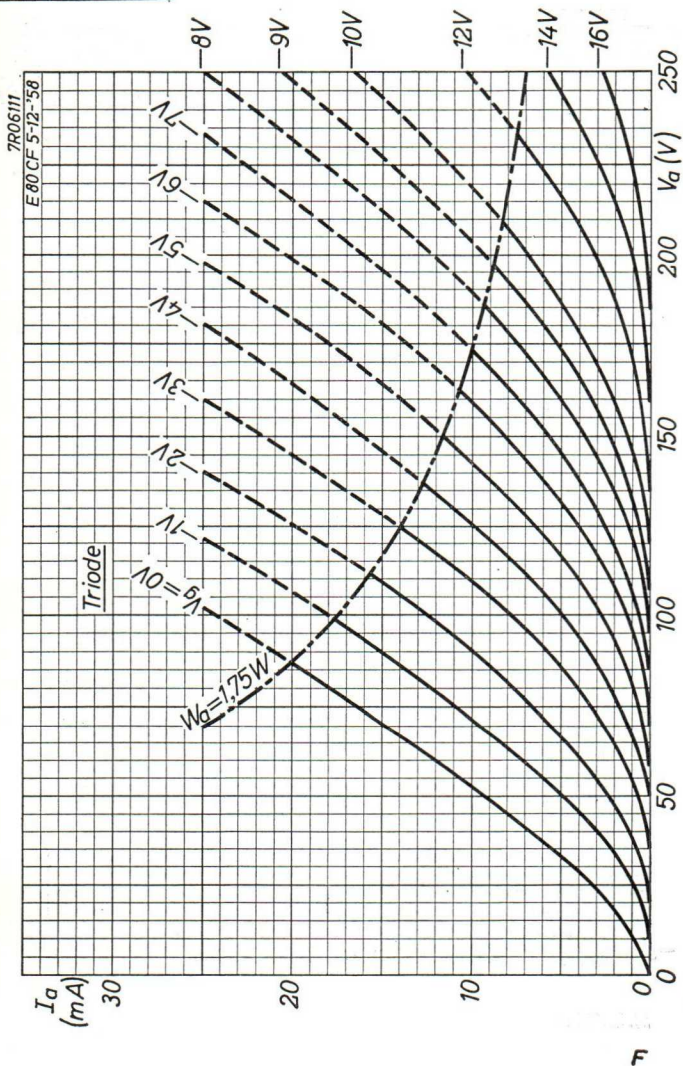
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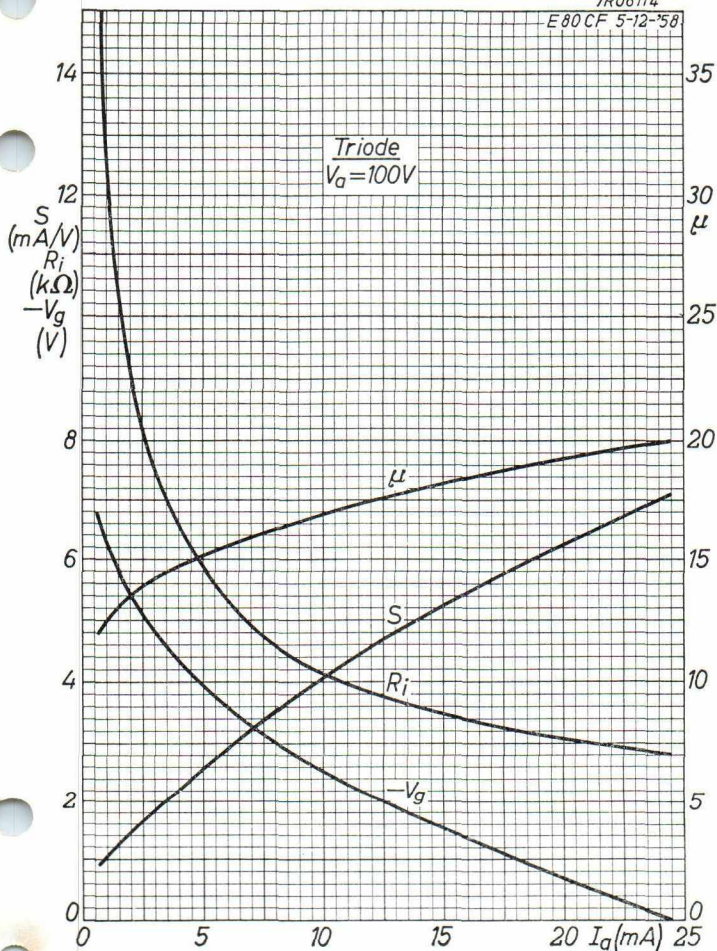
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Triode
 $V_a = 100V$



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