

TRIODE

TY12-15A

Application: R.F. amplifier.
Power output: 40kW continuous rating.
Frequency: 30Mc/s at full ratings.
Construction: External anode, forced-air cooled.

PRELIMINARY DATA

This data should be read in conjunction with GENERAL OPERATIONAL RECOMMENDATIONS—TRANSMITTING VALVES, which precede this section of the handbook.

FILAMENT

Thoriated tungsten

V_f	8.0	V
$*I_f$	130	A

*The filament current must never exceed a surge value of 280A at any time during the warming-up period.

MOUNTING POSITION

Vertical, anode down

CAPACITANCES

C_{a-g}	27	pF
C_{g-r}	45	pF
C_{a-r}	600	mpF

CHARACTERISTICS (measured at $V_a = 12kV$, $I_a = 2A$)

μ	33	
g_m	25	mA/V
g_{m1} (at $V_a = 2kV$, $I_a = 22A$)	40	mA/V

COOLING

Forced-air cooling

$T_{seals\ max.}$	220	°C
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In order to keep within the temperature limits it may be necessary to direct a flow of air on to the seals.

The amount of forced-air cooling required for this valve depends upon the anode dissipation and the height above sea-level. Typical values of inlet temperature, rate of flow of air and pressure difference between the inlet and outlet of the housing are given in the following table.

Anode dissipation P_a (kW)	Height above sea-level h		Inlet temperature T_{in} (°C)	Min. rate of flow of air per minute		Pressure difference between inlet and outlet (mm of H ₂ O)
	(km)	(ft.)		(m ³)	(ft ³)	
7.0	0	0	35	6.6	235	10
7.0	0	0	45	7.7	270	13
7.0	1.5	4920	35	7.9	280	12
7.0	3.0	9840	25	8.3	295	12
10	0	0	35	10.5	370	23
10	0	0	45	12.2	430	31
10	1.5	4920	35	12.6	445	28
10	3.0	9840	25	13.2	465	27
15	0	0	35	18.1	640	60
15	0	0	45	21.2	750	79
15	1.5	4920	35	21.7	765	73
15	3.0	9840	25	22.3	790	70

CLASS 'C' TELEGRAPHY

Limiting values (absolute ratings)

f max.	30	Mc/s
V_a max.	13	kV
I_k max.	5.8	A
$i_{k(pk)}$ max.	28	A
V_g max.	-1.5	kV
I_g max.	1.0	A
P_a max.	15	kW
P_g max.	750	W
R_{g-t} max.	10	kΩ

Operating conditions

f	30	Mc/s
V_a	12	kV
I_a	4.5	A
V_g	-1.0	kV
I_g	800	mA
$V_{in(pk)}$	1.6	kV
$P_{load\ driver}$	1.25	kW
P_a	13	kW
η_a	76	%
P_{out}	41	kW
P_{load} ($\eta_{transfer} = 85\%$)	34.8	kW



CLASS 'C' ANODE MODULATION

Limiting values (absolute ratings) carrier condition for a modulation factor of 1

f max.	30	Mc/s
V _a max.	10	kV
I _k max.	4.8	A
i _{k(pk)} max.	42	A
V _g max.	-1.5	kV
I _g max.	1.0	A
p _a max.	10	kW
p _g max.	750	W
R _{g-t} max.	10	kΩ

Operating conditions

f	30	Mc/s
V _a	10	kV
I _a	3.5	A
V _g	-1.0	kV
I _g	800	mA
V _{in(pk)}	1.5	kV
P _{load driver}	1.2	kW
p _a	7.5	kW
η _a	78.5	%
P _{out}	27.5	kW
P _{load} (η _{transfer} = 85%)	23.5	kW
For 100% modulation		
P _{mod}	17.5	kW

CLASS 'B' A.F.

Limiting values (absolute ratings)

V _a max.	13	kV
I _k max.	4.5	A
i _{k(pk)} max.	14	A
p _a max.	15	kW
R _{g-t} max.	10	kΩ

Operating conditions (two valves)

V _a	10	kV
I _{a(o)}	2 × 100	mA
I _a (max. sig.)	2 × 1.6	A
V _g	-290	V
V _{in(g-g)(r.m.s.)}	640	V
I _g	2 × 35	mA
P _{load driver}	2 × 17	W
p _a	2 × 6.4	kW
η _a	60	%
R _{a-a}	6.24	kΩ
P _{out}	19.2	kW

TY12-15A

TRIODE

WEIGHT

Valve only

{ 42 lbs
19 kg

Shipping weight

{ 186 lbs
84.5 kg

ACCESSORIES

Insulating pedestal

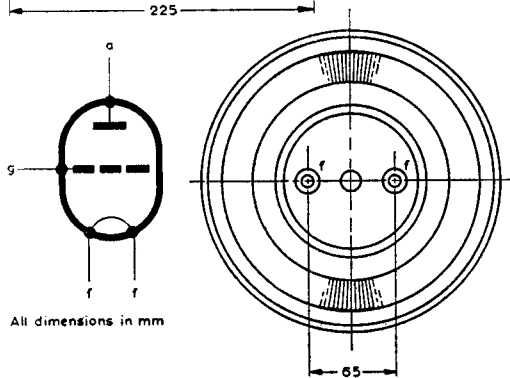
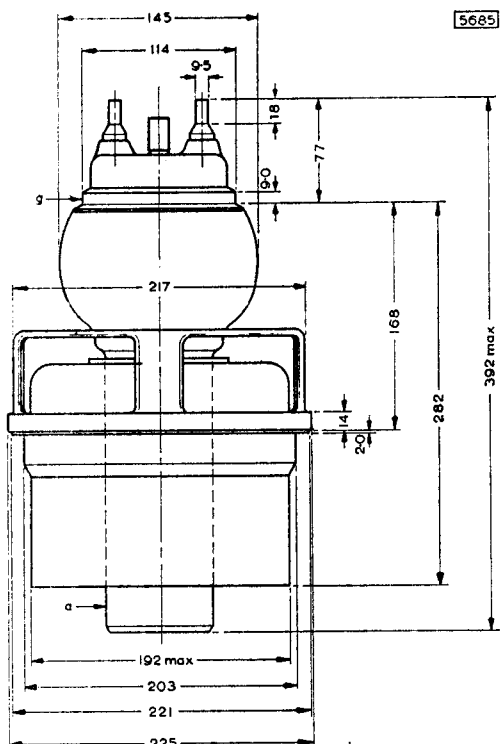
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Grid connector

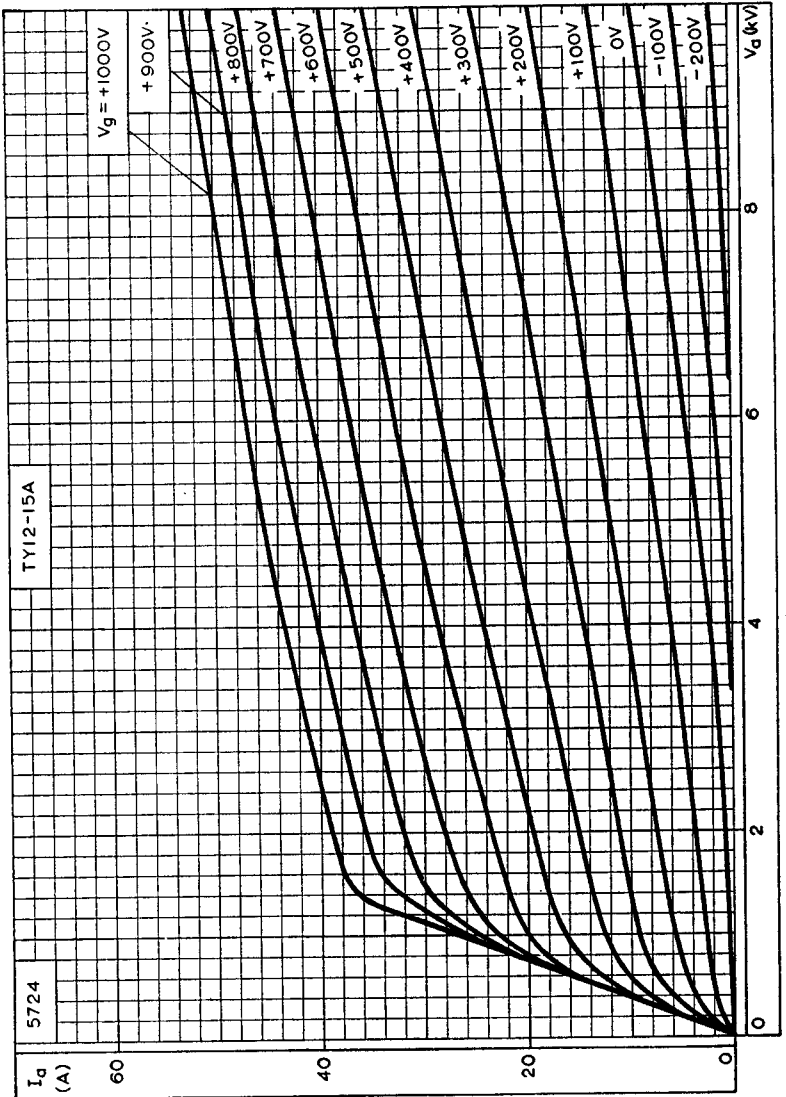
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Filament clips with lead

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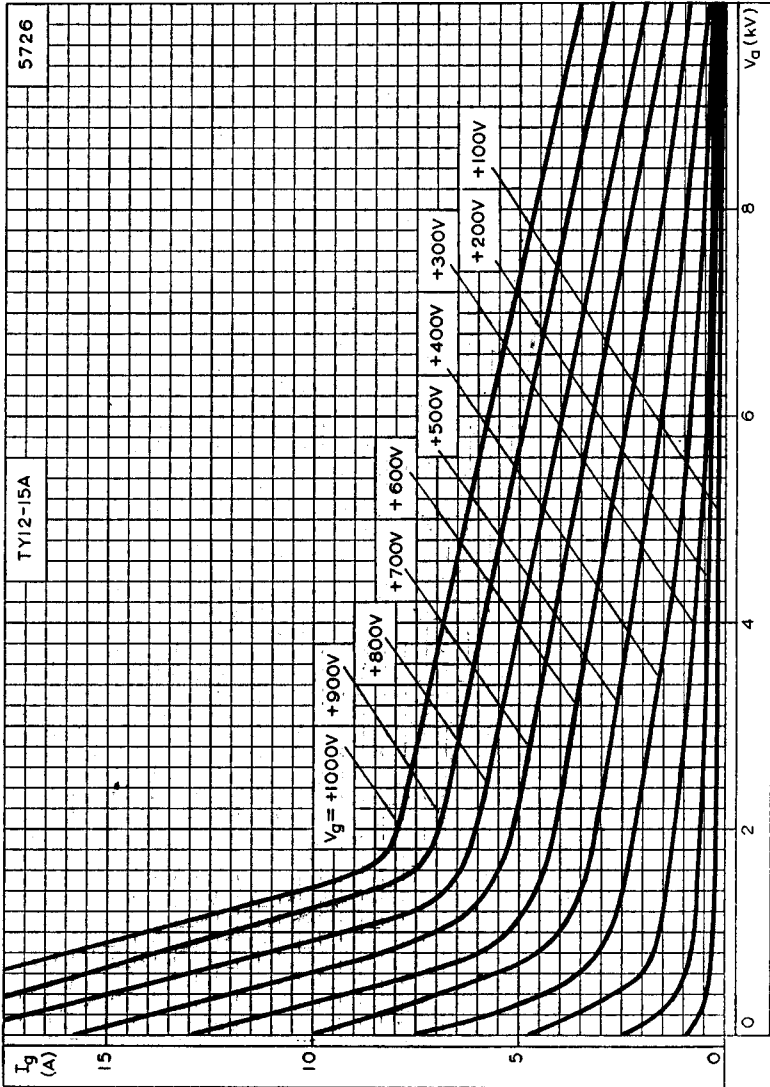
All dimensions in mm



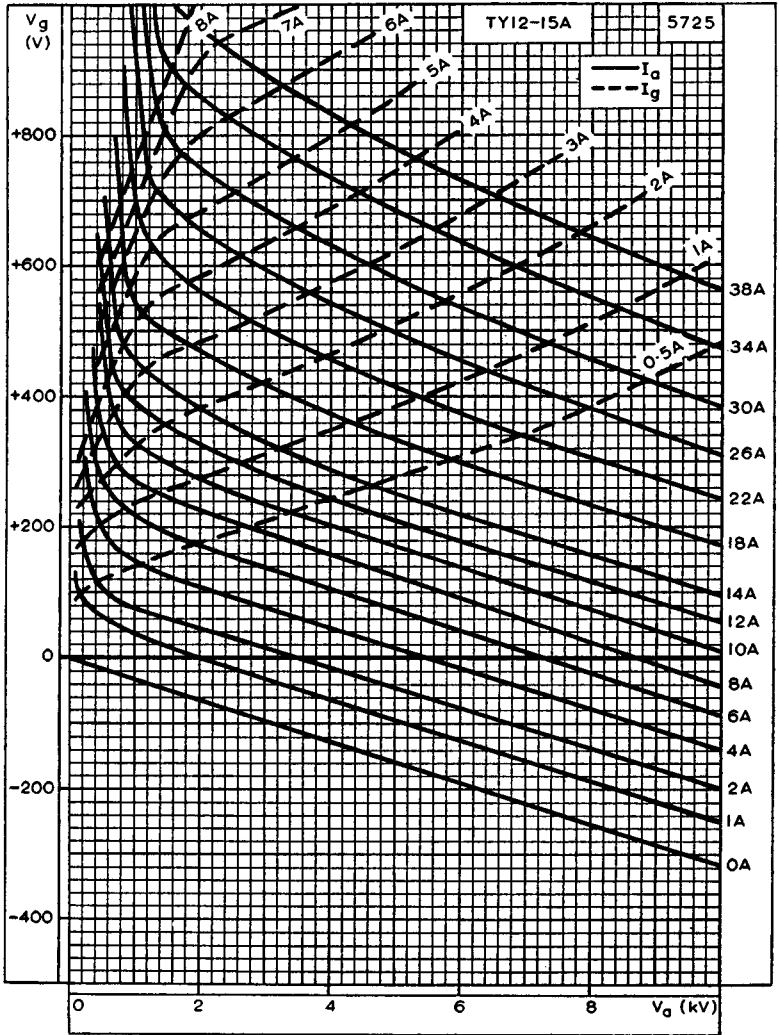
ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER

TY12-15A

TRIODE



CONTROL-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER



CONSTANT CURRENT CURVES

QUICK REFERENCE DATA

External anode, forced-air cooled triode for use as r.f. power amplifier, oscillator or a.f. power amplifier.

	Class 'C' telegraphy	Class 'C' anode modulation	Class 'B' A.F.	
f max.	30	30	—	Mc/s
V _a max.	13	10	13	kV
p _a max.	15	10	15	kW
Performance				
f	30	30	—	Mc/s
P _{out}	41	27.5	40	kW

This data should be read in conjunction with GENERAL OPERATIONAL RECOMMENDATIONS—TRANSMITTING VALVES, which precede this section of the handbook.

FILAMENT

Thoriated tungsten

V _f	8.0	V
*I _f	130	A

*The filament current must never exceed a surge value of 280A at any time during the warming-up period.

MOUNTING POSITION

Vertical, anode down

CAPACITANCES

C _{a-g}	27	pF
C _{g-f}	45	pF
C _{a-f}	600	mpF

CHARACTERISTICS (measured at V_a = 12kV, I_a = 2A)

μ	33	
g _m	25	mA/V
g _m (at V _a = 2kV, I _a = 22A)	40	mA/V

COOLING

Forced-air cooling

$T_{\text{seals max.}}$ 220 °C

In order to keep within the temperature limits it may be necessary to direct a flow of air on to the seals.

The amount of forced-air cooling required for this valve depends upon the anode dissipation and the height above sea-level. Typical values of inlet temperature, rate of flow of air and pressure difference between the inlet and outlet of the housing are given in the following table.

Anode dissipation P_a (kW)	Height above sea-level h		Inlet temperature T_{in} (°C)	Min. rate of flow of air per minute		Pressure difference between inlet and outlet (mm of H ₂ O)
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7.0	0	0	45	7.7	270	13
7.0	1.5	4920	35	7.9	280	12
7.0	3.0	9840	25	8.3	295	12
10	0	0	35	10.5	370	23
10	0	0	45	12.2	430	31
10	1.5	4920	35	12.6	445	28
10	3.0	9840	25	13.2	465	27
15	0	0	35	18.1	640	60
15	0	0	45	21.2	750	79
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15	3.0	9840	25	22.3	790	70

CLASS 'C' TELEGRAPHY

Absolute maximum ratings

f max.	30	Mc/s
V_a max.	13	kV
I_k max.	5.8	A
$i_{k(pk)}$ max.	28	A
V_g max.	-1.5	kV
I_g max.	1.0	A
P_a max.	15	kW
P_g max.	750	W
R_{g-f} max.	10	kΩ

Operating conditions

f	30	Mc/s
V_a	12	kV
I_a	4.5	A
V_g	-1.0	kV
I_g	800	mA
$V_{in(pk)}$	1.6	kV
P_{load} (driver)	1.25	kW
P_a	13	kW
η_a	76	%
P_{out}	41	kW
P_{load}	34.8	kW



CLASS 'C' ANODE MODULATION

Absolute maximum ratings (carrier condition for a modulation factor of 1)

f max.	30	Mc/s
V_a max.	10	kV
I_k max.	4.8	A
$i_{k(pk)}$ max.	42	A
V_g max.	-1.5	kV
I_g max.	1.0	A
P_a max.	10	kW
P_g max.	750	W
R_{g-t} max.	10	k Ω

Operating conditions

f	30	Mc/s
V_a	10	kV
I_a	3.5	A
V_g	-1.0	kV
I_g	800	mA
$V_{in(pk)}$	1.5	kV
$P_{load\ driver}$	1.2	kW
P_a	7.5	kW
γ_a	78.5	%
P_{out}	27.5	kW
P_{load}	23.5	kW
For 100% modulation		
P_{mod}	17.5	kW

CLASS 'B' A.F.

Absolute maximum ratings

V_a max.	13	kV
I_k max.	4.5	A
$i_{k(pk)}$ max.	14	A
P_a max.	15	kW
R_{g-t} max.	10	k Ω

Operating conditions (two valves)

V_a	10	10	8.0	kV
$I_{a(10)}$	2 × 100	2 × 500	2 × 500	mA
I_a (max. sig.)	2 × 2.0	2 × 3.3	2 × 4.2	A
V_g	-290	-270	-220	V
$V_{in(g-g)r.m.s.}$	325	440	430	V
I_g	2 × 143	2 × 875	2 × 800	mA
$P_{load\ driver}$	2 × 55	2 × 360	2 × 300	W
P_a	2 × 8.0	2 × 12.8	2 × 13.6	kW
γ_a	60	61	59.5	%
R_{a-a}	5.5	4.4	2.3	k Ω
P_{out}	24	40	40	kW
P_{load}	22	36	36	kW



TY12-15A

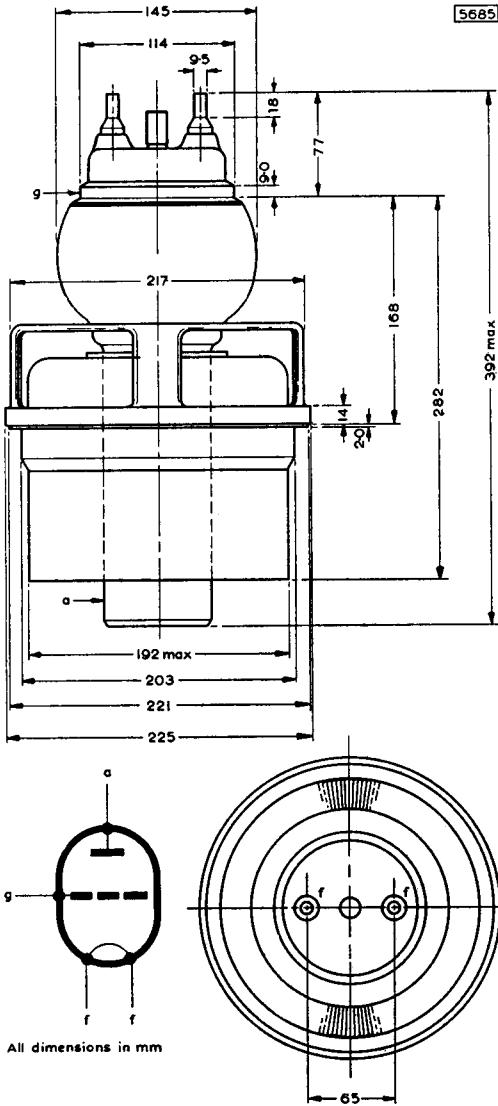
TRIODE

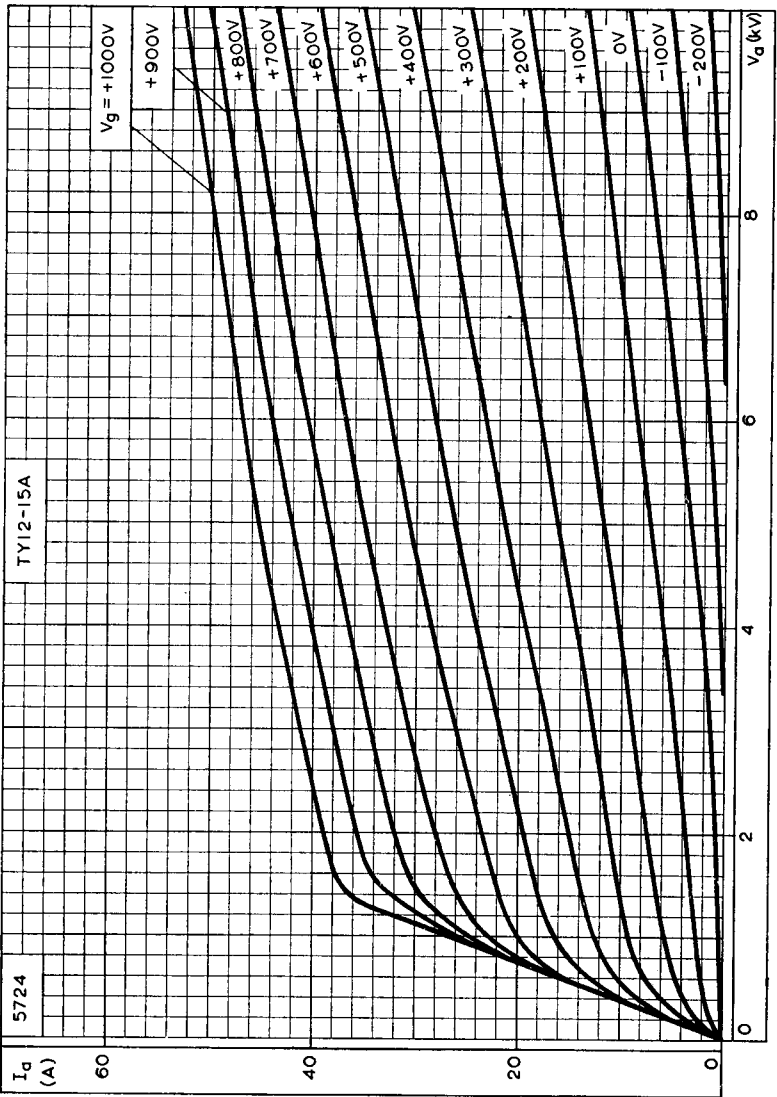
WEIGHT

Valve only	{	42	lb
		19	kg
Shipping weight	{	186	lb
		84.5	kg

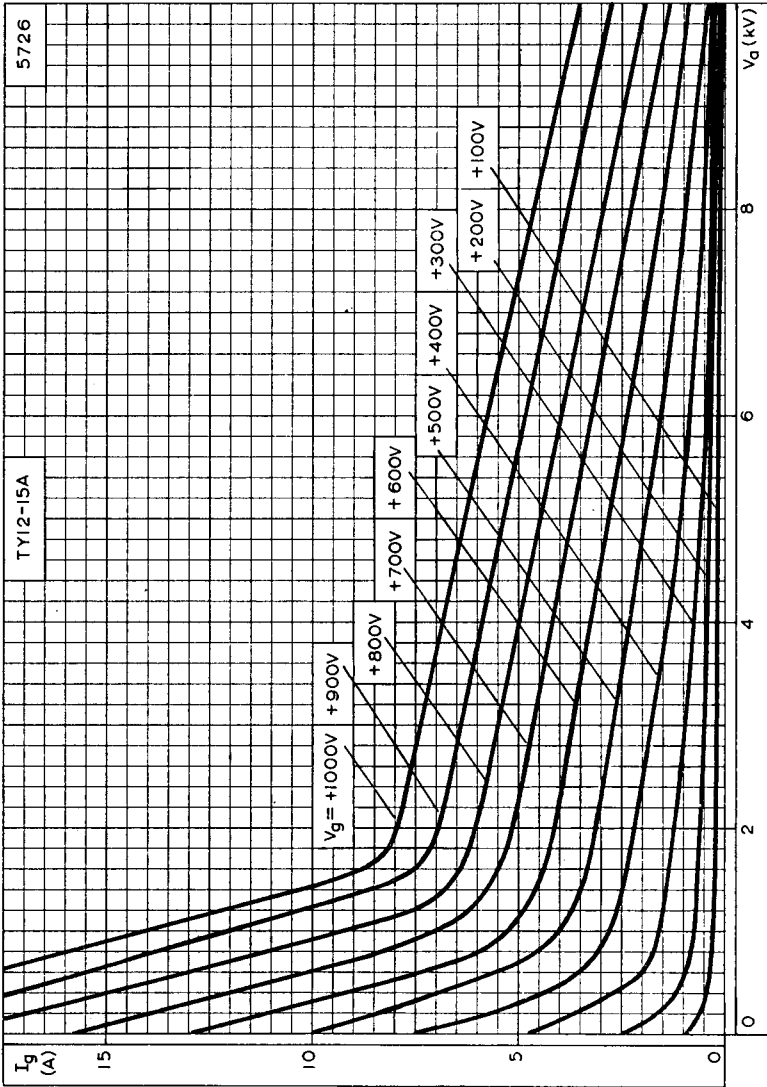
ACCESSORIES

Insulating pedestal	40648
Grid connector	40663
Filament clips with lead	40662

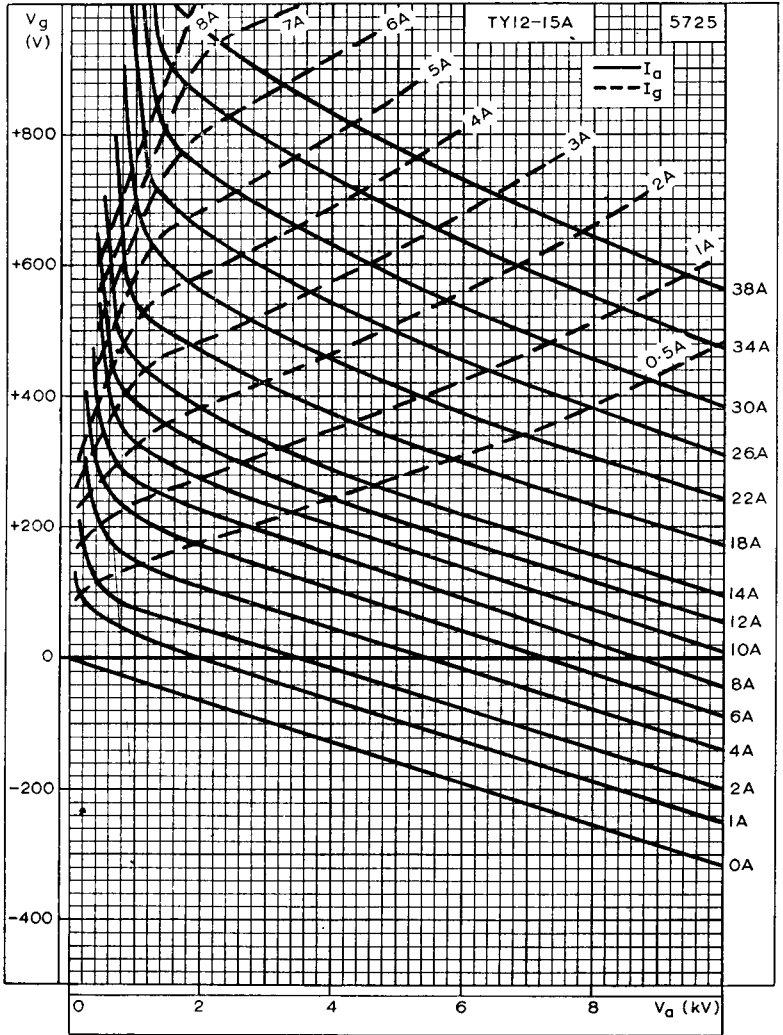




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CONTROL-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER



CONSTANT CURRENT CURVES