R.F. POWER TETRODE

# QY5-800

PRELIMINARY DATA

## QUICK REFERENCE DATA

*Radiation and convection cooled tetrode intended for use as a linear amplifier in single side band suppressed carrier applications.*

| | Class 'C' telegraphy | Class 'AB1' SSB. | |
|---|---|---|---|
| f max. | 30 | 30 | Mc/s |
| $V_a$ max. | 5.5 | 5.5 | kV |
| $p_a$ max. | 800 | 800 | W |
| Performance | | | |
| f | 30 | 30 | Mc/s |
| $P_{out}$ | 2.4 | 1.3 | kW |

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

### FILAMENT

Thoriated tungsten

| | | |
|---|---|---|
| $V_f$ | 7.5 | V |
| $I_f$ | 22.6 | A |
| $I_{f(surge)}$ max. | 45 | A |

### MOUNTING POSITION

Vertical

### CAPACITANCES

| | | |
|---|---|---|
| $C_{in}$ | 47.6 | pF |
| $C_{out}$ | 9.5 | pF |
| $C_{a-g1}$ | 100 | mpF |

### CHARACTERISTICS

| | | |
|---|---|---|
| $V_a$ | 4.0 | kV |
| $V_{g2}$ | 600 | V |
| $I_a$ | 200 | mA |
| $g_m$ | 10 | mA/V |
| $\mu_{g1-g2}$ | 5.1 | |

## COOLING

In order to keep the temperature below the maximum permitted values it may be necessary to direct an air flow on to the seals.

| | | |
|---|---|---|
| $T_{anode\ seal}$ max. | 220 | °C |
| $T_{base\ seals}$ max. | 180 | °C |
| $T_{bulb}$ max. | 350 | °C |

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

### Absolute maximum ratings

| | | |
|---|---|---|
| f max. | 30 | Mc/s |
| $V_a$ max. | 5.5 | kV |
| $p_a$ max. | 800 | W |
| $V_{g2}$ max. | 800 | V |
| $p_{g2}$ max. | 120 | W |
| $-V_{g1}$ max. | 500 | V |
| $I_{g1}$ (max.) | 35 | mA |
| $I_k$ max. | 925 | mA |
| $i_{k(pk)}$ max. | 4.5 | A |
| $R_{g1-f}$ max. | 20 | kΩ |

### Typical operation

| | | |
|---|---|---|
| f | 30 | Mc/s |
| $V_a$ | 5.0 | kV |
| $V_{g2}$ | 600 | V |
| $V_{g1}$ | −240 | V |
| $I_a$ | 600 | mA |
| $I_{g2}$ | 185 | mA |
| $I_{g1}$ | 20 | mA |
| $v_{in(pk)}$ | 300 | V |
| $P_{load\ (driver)}$ | 10 | W |
| $p_a$ | 600 | W |
| $\eta_a$ | 80 | % |
| $P_{out}$ | 2.4 | kW |
| $P_{load}$ | 2.0 | kW |

## CLASS 'AB1' SINGLE SIDEBAND SUPPRESSED CARRIER

### Absolute maximum ratings

| | | |
|---|---|---|
| f max. | 30 | Mc/s |
| $V_a$ max. | 5.5 | kV |
| $V_{g2}$ max. | 800 | V |
| $p_a$ max. | 800 | W |
| $p_{g2}$ max. | 120 | W |
| $I_k$ max. | 700 | mA |
| $i_{k(pk)}$ max. | 2.25 | A |
| $-V_{g1}$ max. | 500 | V |

### Typical operation

Envelope peak to average ⩾1 and <2

| | | |
|---|---|---|
| f | 30 | Mc/s |
| $V_a$ | 4.0 | kV |
| $V_{g2}$ | 600 | V |
| *$V_{g1}$ | −110 | V |
| $I_{a(o)}$ | 150 | mA |

'Single tone' modulation, maximum signal conditions

| | | |
|---|---|---|
| $I_a$ | 465 | mA |
| $I_{g2}$ | 85 | mA |
| $I_{g1}$ | 0 | mA |
| $v_{in(pk)}$ | 100 | V |
| $P_{load\ (driver)}$ | 3.0 | W |
| $p_a$ | 560 | W |
| $p_{g2}$ | 51 | W |
| $P_{out}$ | 1.3 | kW |
| $\eta_a$ | 69 | % |
| $P_{load}$ | 1.11 | kW |

'Two tone' modulation, maximum signal conditions

| | | |
|---|---|---|
| $I_a$ | 330 | mA |
| $I_{g2}$ | 40 | mA |
| $I_{g1}$ | 0 | mA |
| $v_{in(pk)}$ | 100 | V |
| $P_{load\ (driver)}$ | 1.5 | W |
| $p_a$ | 670 | W |
| $p_{g2}$ | 24 | W |
| P.E.$P_{out}$ | 1.3 | kW |
| $P_{out}$ (mean) | 650 | W |
| $\eta_a$ | 49 | % |
| P.E.$P_{load}$ | 1.11 | kW |
| †$D_{im}$ | 35 | dB |

*$V_{g1}$ is set to give the $I_{a(o)}$ and will vary slightly from valve to valve.

†The voltage amplitude of all intermodulation products are below this level which is referred to the amplitude of either of the two tone frequencies. Relative to the peak envelope power these figures will be increased by 6dB. The figures are measured at full drive.

# QY5-800

## R.F. POWER TETRODE

### PHYSICAL DATA

| | | |
|---|---|---|
| Weight of valve | 1.4 | lb |
| | 620 | g |
| Weight of valve plus carton | 5.0 | lb |
| | 2.25 | kg |

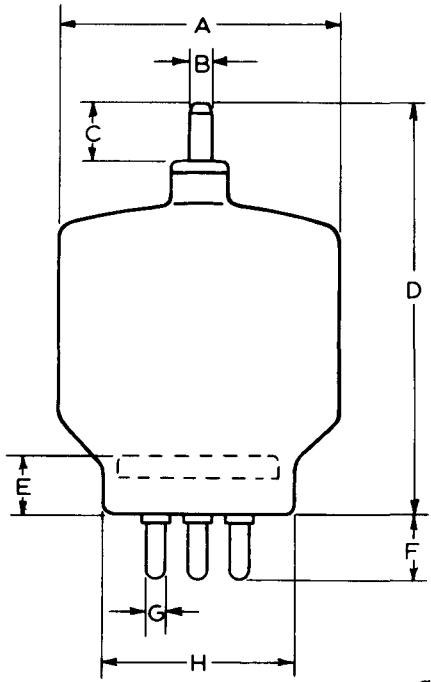
### ACCESSORIES

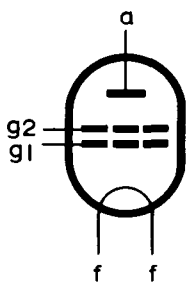
| | |
|---|---|
| Socket | 40216 |
| Anode clip | 40665 |

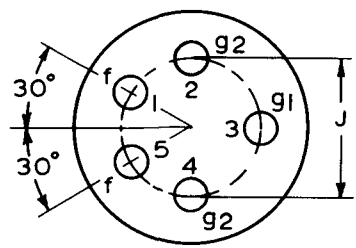
### DIMENSIONS

| | *Inches* | *Millimetres* | |
|---|---|---|---|
| A | 6.02 | 153 | max. |
| B | 0.374 | 9.5 | |
| C | 0.98 | 25 | |
| D | 8.46 ± 0.24 | 215 ± 6 | |
| E | 1.75 | 44.5 | |
| F | 1.06 | 27 | |
| G | 0.374 | 9.5 | |
| H | 3.19 | 81 | max. |
| J | 1.50 | 38.1 | |

# QY5-800



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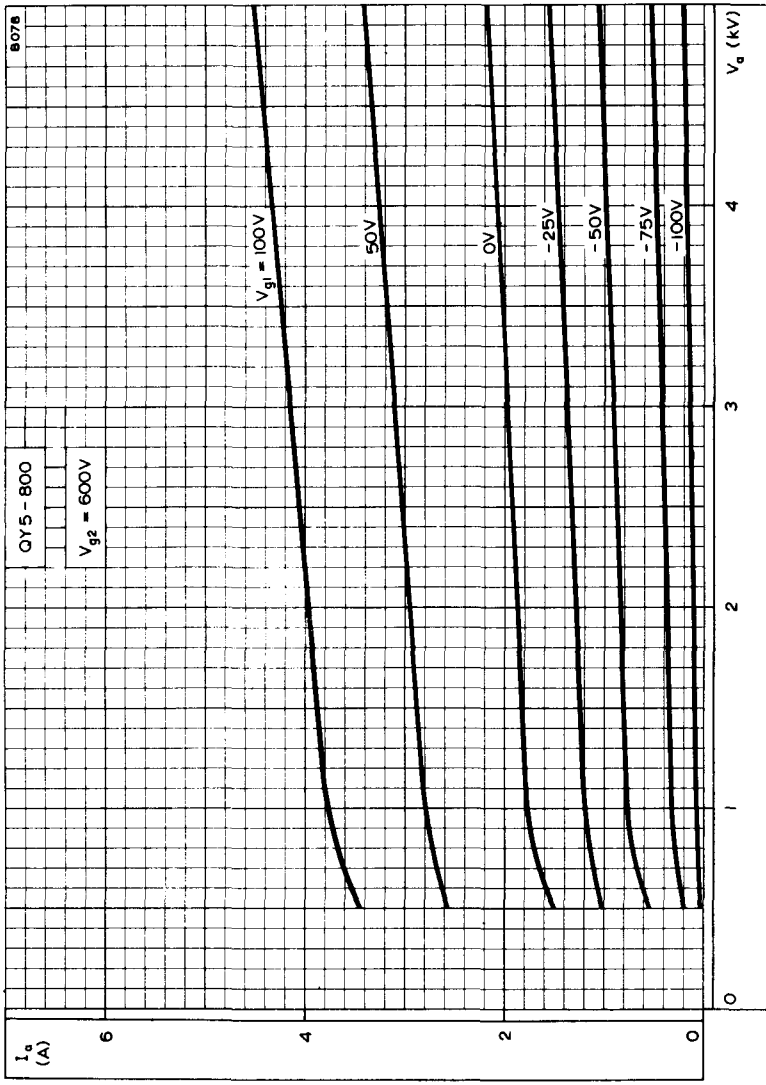
B5K Base

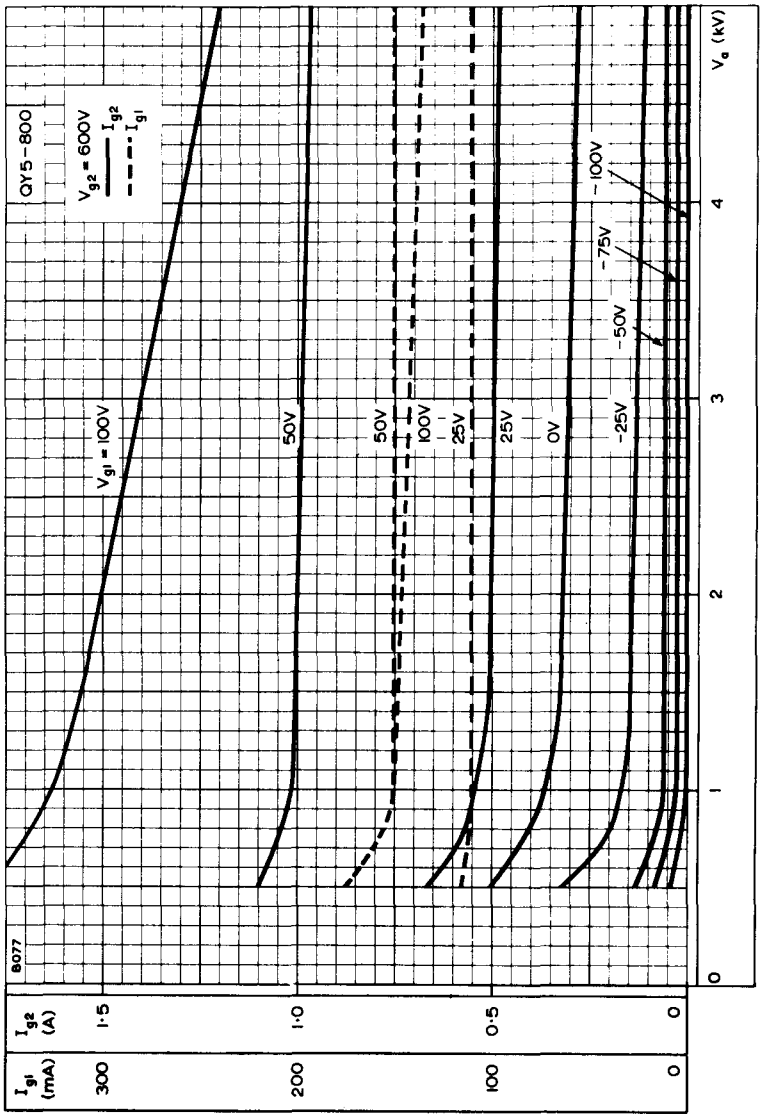
# QY5-800



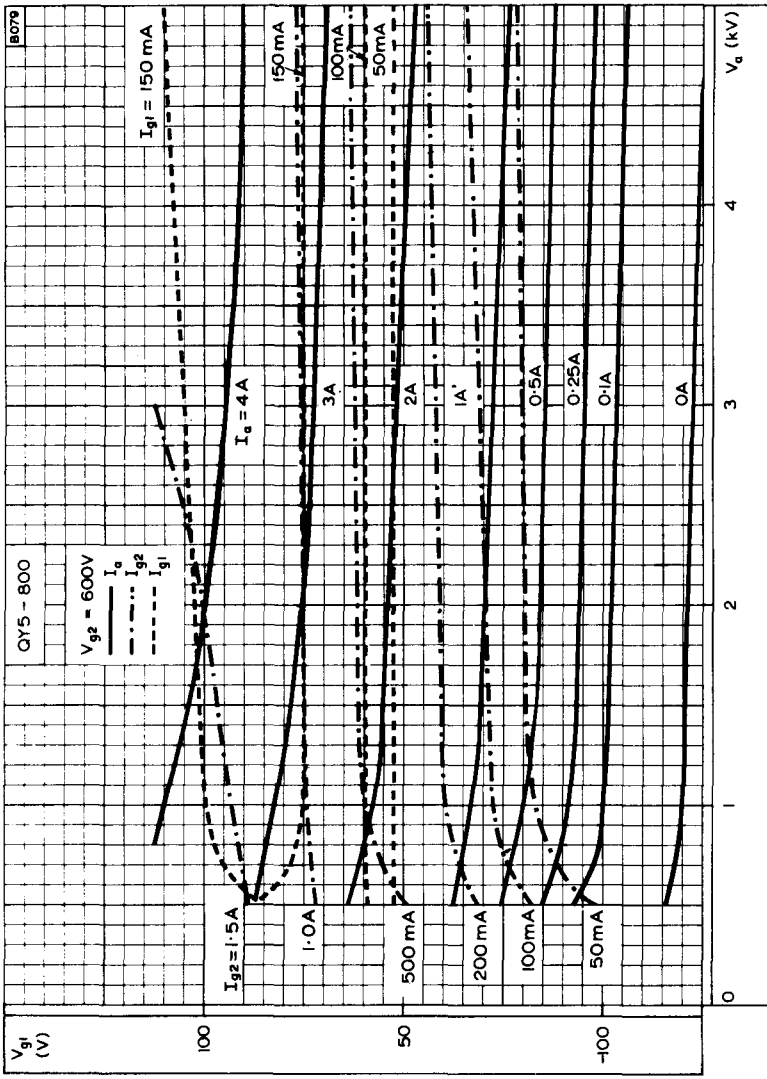

ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER

# QY5-800

## R.F. POWER TETRODE




SCREEN-GRID AND CONTROL-GRID CURRENTS PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER




CONSTANT CURRENT CURVES

# V.H.F. POWER TETRODE QY5-800

QUICK REFERENCE DATA

Radiation and convection cooled tetrode intended for use as a linear amplifier in single sideband suppressed carrier applications.

| | Class 'AB1' Linear Amplifier for S.S.B. operation | Class 'C' Telegraphy or F.M. Telephony | |
|---|---|---|---|
| f | 30 | 30 | Mc/s |
| $P_{out}$ | *1.3 | 2.4 | kW |
| f max. | 30 | 30 | Mc/s |
| $V_a$ max. | 5.5 | 5.5 | kV |
| $p_a$ max. | 800 | 800 | W |

*P.E.$P_{out}$

*To be read in conjunction with*

GENERAL OPERATIONAL RECOMMENDATIONS - TRANSMITTING VALVES

CLASS 'C' TELEGRAPHY OR F.M. TELEPHONY

Maximum operating conditions

| | | |
|---|---|---|
| f | 30 | Mc/s |
| $P_{out}$ | 2.4 | kW |
| $P_{load}$ | 2.0 | kW |
| $\eta_a$ | 80 | % |
| $V_a$ | 5.0 | kV |
| $I_a$ | 600 | mA |
| $V_{g2}$ | 600 | V |
| $I_{g2}$ | 185 | mA |
| $-V_{g1}$ | 240 | V |
| $I_{g1}$ | 20 | mA |
| $v_{in}$ pk | 300 | V |
| $P_{load}$ (driver) | 10 | W |
| $p_a$ | 600 | W |

## CLASS 'AB1' LINEAR AMPLIFIER FOR SINGLE SIDEBAND OPERATION

Maximum operating conditions

| | | |
|---|---|---|
| f | 30 | Mc/s |
| P.E.$P_{out}$ | 1.3 | kW |
| P.E.$P_{load}$ | 1.1 | kW |
| **$d_3$ | 35 | dB |
| **$d_5$ | 40 | dB |
| $V_a$ | 4.0 | kV |
| $V_{g2}$ | 600 | V |
| ***$-V_{g1}$ | 110 | V |
| $I_{a(o)}$ | 150 | mA |
| $I_{g2(o)}$ | 8.0 | mA |

| | Single tone | Double tone | |
|---|---|---|---|
| $I_a$ | 465 | 330 | mA |
| $I_{g2}$ | 85 | 40 | mA |
| $I_{g1}$ | 0 | 0 | mA |
| $V_{in(pk)}$ | 100 | 100 | V |
| $P_{load}$ (driver) | 3.0 | - | W |
| $p_a$ | 560 | 670 | W |
| $\eta_a$ | 69 | 49 | % |

**Third and fifth order intermodulation products. Maximum values encountered at any level of drive voltage referred to the amplitude of either of the two tones at that level.

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

## ABSOLUTE MAXIMUM RATINGS

| | Class 'AB1' S.S.B. | Class 'C' Telegraphy | |
|---|---|---|---|
| f max. | 30 | 30 | Mc/s |
| $V_a$ max. | 5.5 | 5.5 | kV |
| $V_{g2}$ max. | 800 | 800 | V |
| $-V_{g1}$ max. | 500 | 500 | V |
| $I_k$ max. | 700 | 925 | mA |
| $p_a$ max. | 800 | 800 | W |
| $p_{g2}$ max. | 120 | 120 | W |
| $I_{g1}$ max. | 0 | 35 | mA |
| $p_{g1}$ max. | 0 | 40 | W |
| $R_{g1-f}$ max. | 20 | 20 | kΩ |

CATHODE

Directly heated, thoriated tungsten

| | | |
|---|---|---|
| $V_f$ | 7.5 | V |
| $I_f$ | 22.6 | A |
| $I_f$ (surge) | 45 | A |

CAPACITANCES

| | | |
|---|---|---|
| $c_{a-g1}$ | 100 | nF |
| $c_{out}$ | 9.5 | pF |
| $c_{in}$ | 47.6 | pF |

CHARACTERISTICS (measured at $V_a$ = 4.0kV, $V_{g2}$ = 600V, $I_a$ = 200mA)

| | | |
|---|---|---|
| $g_m$ | 10 | mA/V |
| $\mu_{g1-g2}$ | 5.1 | |

MOUNTING POSITION Vertical

COOLING

Radiation and convection.

Maximum temperatures

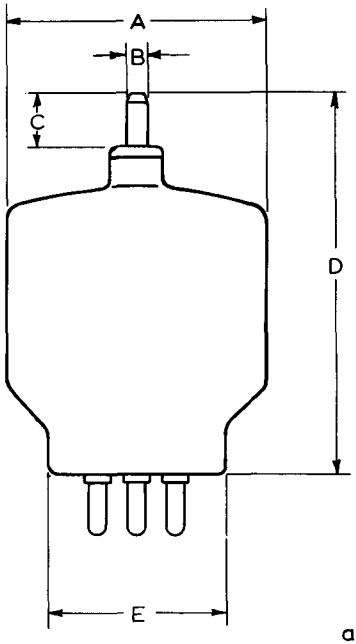
| | | |
|---|---|---|
| Anode seal | 220 | °C |
| Base seals | 180 | °C |
| Bulb | 350 | °C |

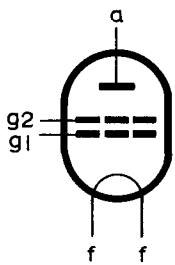
PHYSICAL DATA

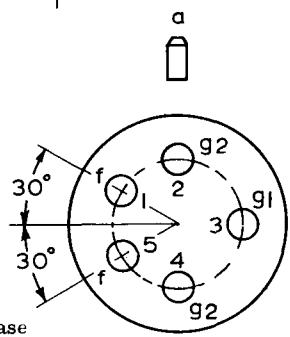
| | lb | kg |
|---|---|---|
| Weight of valve | 1.4 | 0.62 |
| Weight of valve and carton | 5.0 | 2.25 |

ACCESSORIES

| | |
|---|---|
| Socket | 40216 |
| Anode clip | 40665 |



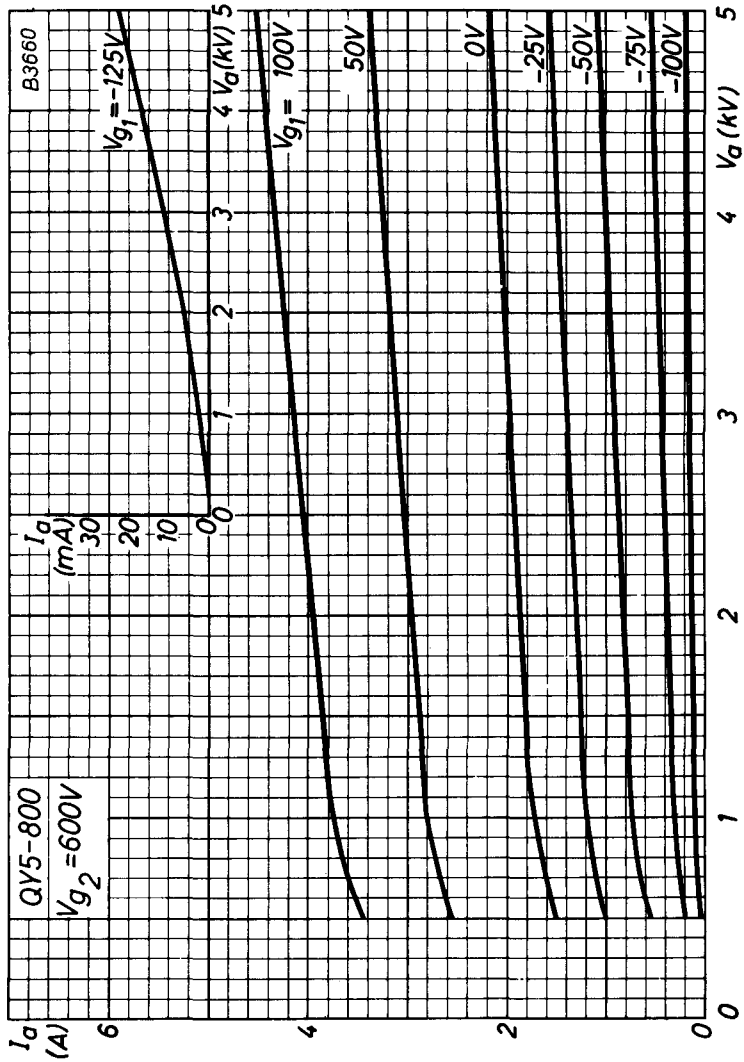

B5K base
(according to BS448)

9321

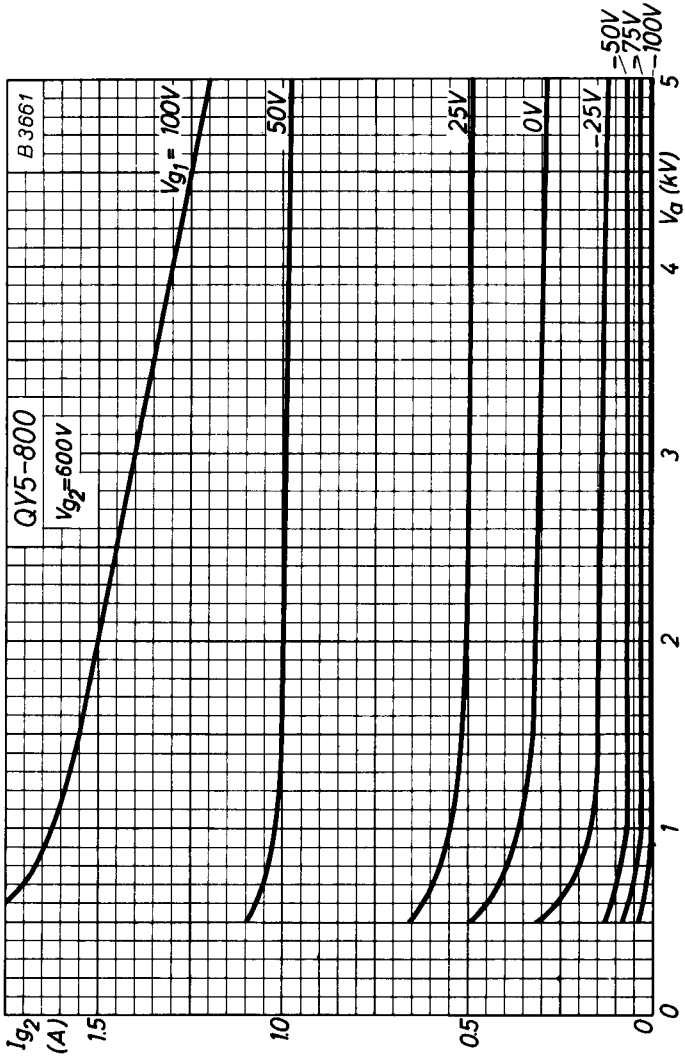
DIMENSIONS

| | Inches | Millimetres | |
|---|---|---|---|
| A | 6.023 | 153 | max. |
| B | 0.374 | 9.5 | |
| C | 0.984 | 25 | |
| D | 8.465 ± 0.236 | 215 ± 6.0 | |
| E | 3.189 | 81 | max. |

Inch dimensions derived from original millimetre dimensions.

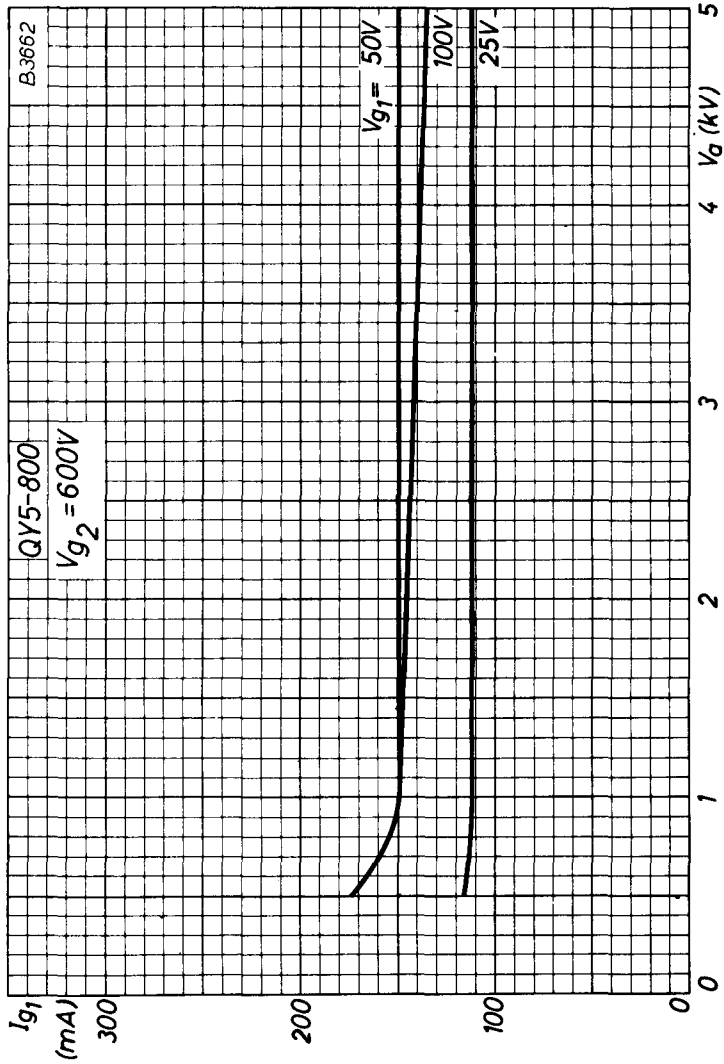



ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER, $V_{g2}$ = 600V

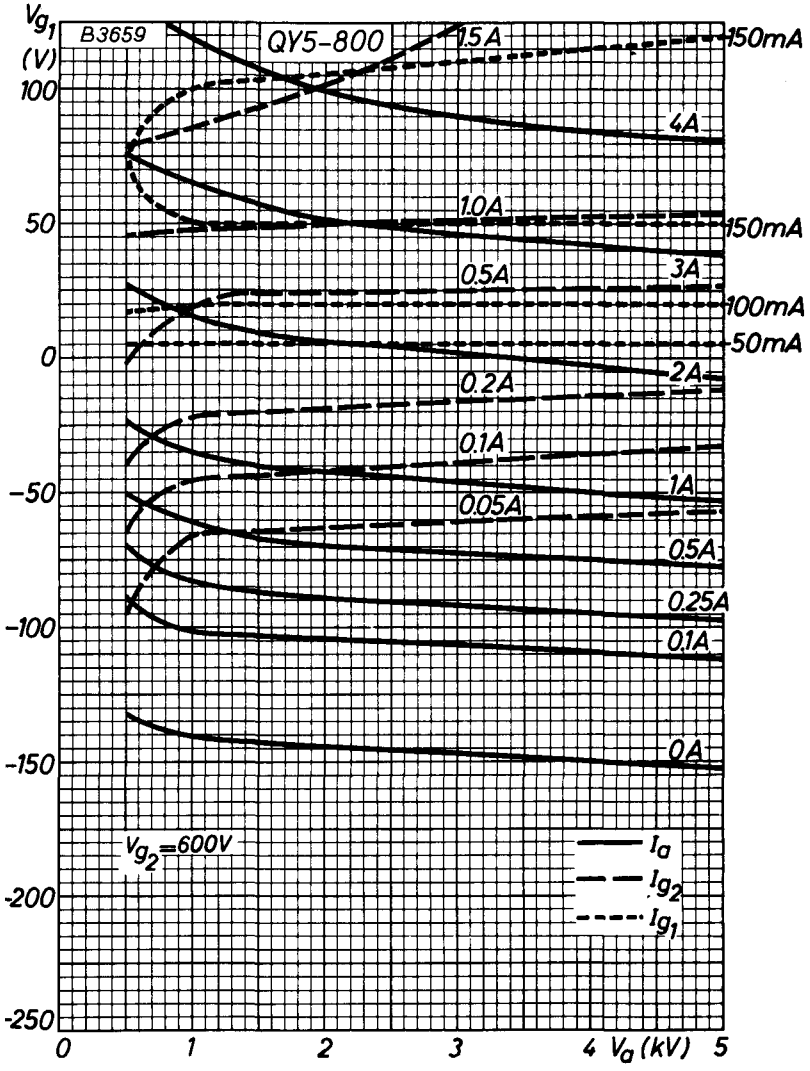



SCREEN-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER

$V_{g2}$ = 600V




CONTROL-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER. $V_{g2}$ = 600V




CONSTANT CURRENT CHARACTERISTICS. $V_{g2}$ = 600V